ONTARIO
DEPARTMENT OF MINES

ANNUAL REPORT
of
RESIDENT GEOLOGISTS' SECTION
GEOLOGICAL BRANCH

1967

Compliments of
ONTARIO
MINISTRY OF NORTHERN DEVELOPMENT
AND MINES
Not for resale

PART 1

Kenora District by J. C. Davies
Port Arthur District by C. R. Kustra

MISCELLANEOUS PAPER 16

MARCH, 1968

93-00934/

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Preface

This annual report for 1967 is the first separate publication covering the work of the Resident Geologists of the Department of Mines for a specific calendar year. In the past the annual "Summary of Field Work by the Geological Branch" had a section devoted to the activities of the Resident Geologists. This is now discontinued. In the future there will be two separate publications, one dealing with the activities of the summer field parties and published late in the calendar year; the other will cover the Resident Geologists' work and be published early in the following year.

This annual report is issued in four parts to cover the Resident Geologists' districts as follows:

Part 1. Kenora and Port Arthur.
Part 2. Sault Ste. Marie and Sudbury.
Part 3. Kirkland Lake, Cobalt, and Timmins.
Part 4. Southern Ontario.

These reports may be issued at separate times and not necessarily in the order listed above. Notices of the releases will be mailed to those on the Department of Mines Notification List.

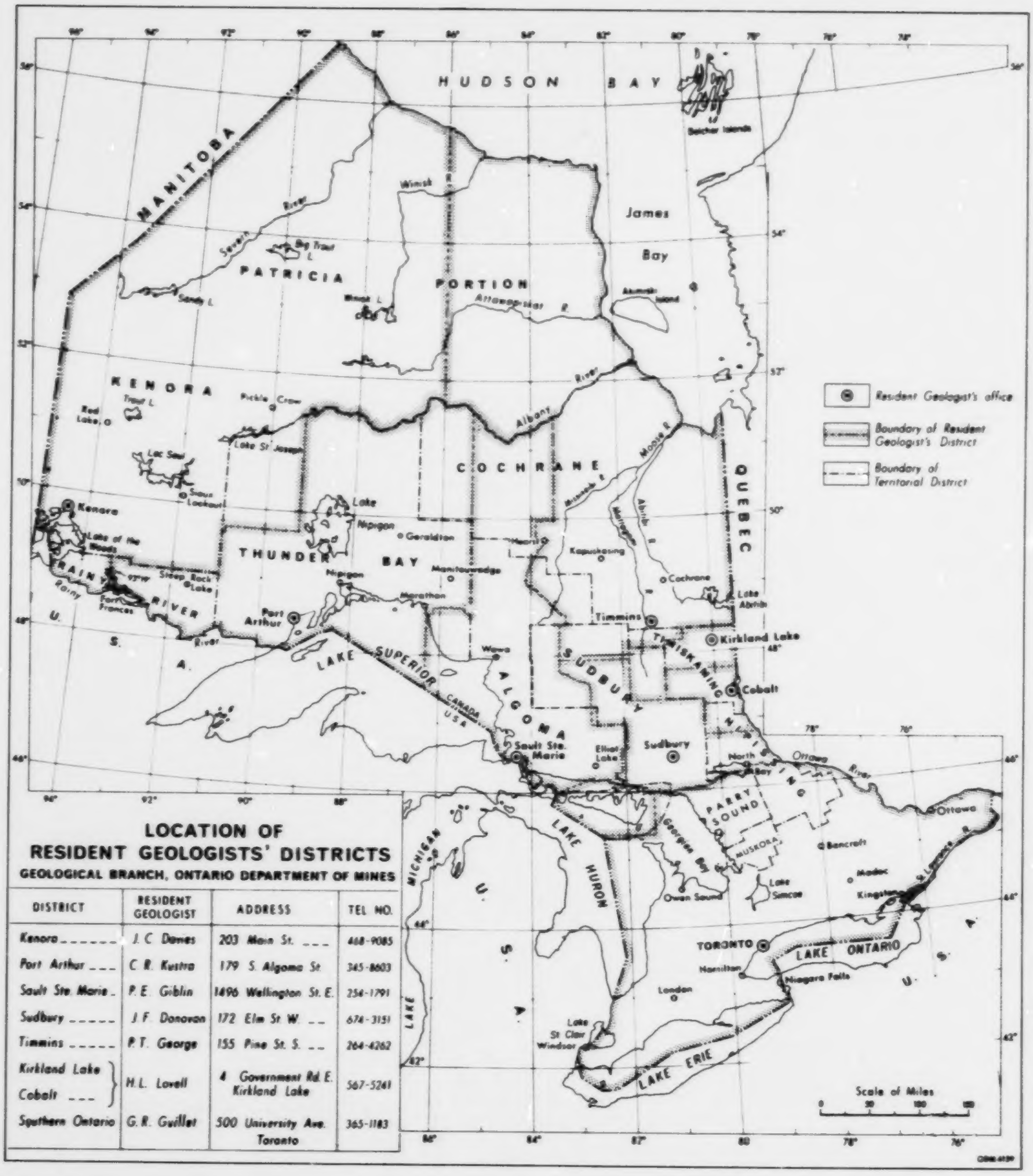
The Resident Geologists are stationed throughout the province to carry on field work and to gather and disseminate information concerning the geology and mineral resources of their districts. At some localities one or more field geologists of the Geological Surveys Section may be permanently

located with the Resident Geologist. In addition to personal observations of the staff, the information collected at the offices includes diamond-drilling records, geological, geophysical, and geochemical maps and reports submitted to the government for assessment work credit, and data on mineral deposits contributed by companies or individuals on a voluntary basis. This information is indexed and kept on open file. Duplicate copies of the assessment work data are also on open file at Room 1323, Mining Lands Branch, Department of Mines, Parliament Buildings, Toronto.

The miscellaneous duties of the Resident Geologists are described in the reports that follow. An index map showing the outline of the resident geologists' districts, and the names, addresses and telephone numbers of the Resident Geologists is shown on the next page.

The objective of this report is to summarize the highlights of the mineral industry in each district during the past year, and also to present any significant new information that may have a bearing on future mineral developments. This could be new discoveries, new geological concepts, new access roads, new maps and literature, the influence of technological advances, new marketing conditions, etc. It is hoped that such data may be useful to those engaged in mineral exploration throughout the province.

J. E. Thomson,
Chief, Resident Geologists' Section.


HUDSON BAY
James Bay
MANITOBA
QUEBEC
PATRICIA PORTION
KENORA
COCHRANE
THUNDER BAY
ALGOMA
SUDBURY
TEMISKAMING
NIPISSING
PARRY SOUND
MUSKOKA
RAINY RIVER
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
LAKE ONTARIO
LAKE ERIE
Georgian Bay
Kenora
Red Lake
Pickle Crow
Sioux Lookout
Port Arthur
Geraldton
Manitouwadge
Marathon
Wawa
Hearst
Kapuskasing
Cochrane
Timmins
Kirkland Lake
Cobalt
Sudbury
Elliot Lake
Sault Ste. Marie
North Bay
Ottawa
Bancroft
Madoc
Kingston
Toronto
Hamilton
Niagara Falls
London
Windsor
Owen Sound
Fort Frances
Belcher Islands
Akimiski Island
Albany River
Attawapiskat R.
Winisk R.
Severn River
Moose R.
Ottawa River
St. Lawrence R.
U. S. A.
CANADA
USA
Resident Geologist's office
Boundary of Resident Geologist's District
Boundary of Territorial District
Scale of Miles
0
50
100
150

LOCATION OF RESIDENT GEOLOGISTS' DISTRICTS

GEOLOGICAL BRANCH, ONTARIO DEPARTMENT OF MINES

DISTRICT	RESIDENT GEOLOGIST	ADDRESS	TEL NO.
Kenora	J. C. Davies	203 Main St.	468-9085
Port Arthur	C. R. Kustra	179 S. Algoma St.	345-8603
Sault Ste. Marie	P. E. Giblin	1496 Wellington St. E.	254-1791
Sudbury	J. F. Donovan	172 Elm St. W.	674-3151
Timmins	P. T. George	155 Pine St. S.	264-4262
Kirkland Lake Cobalt	H. L. Lovell	4 Government Rd. E. Kirkland Lake	567-5241
Southern Ontario	G. R. Guillet	500 University Ave. Toronto	365-1183

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by J.C. Davies

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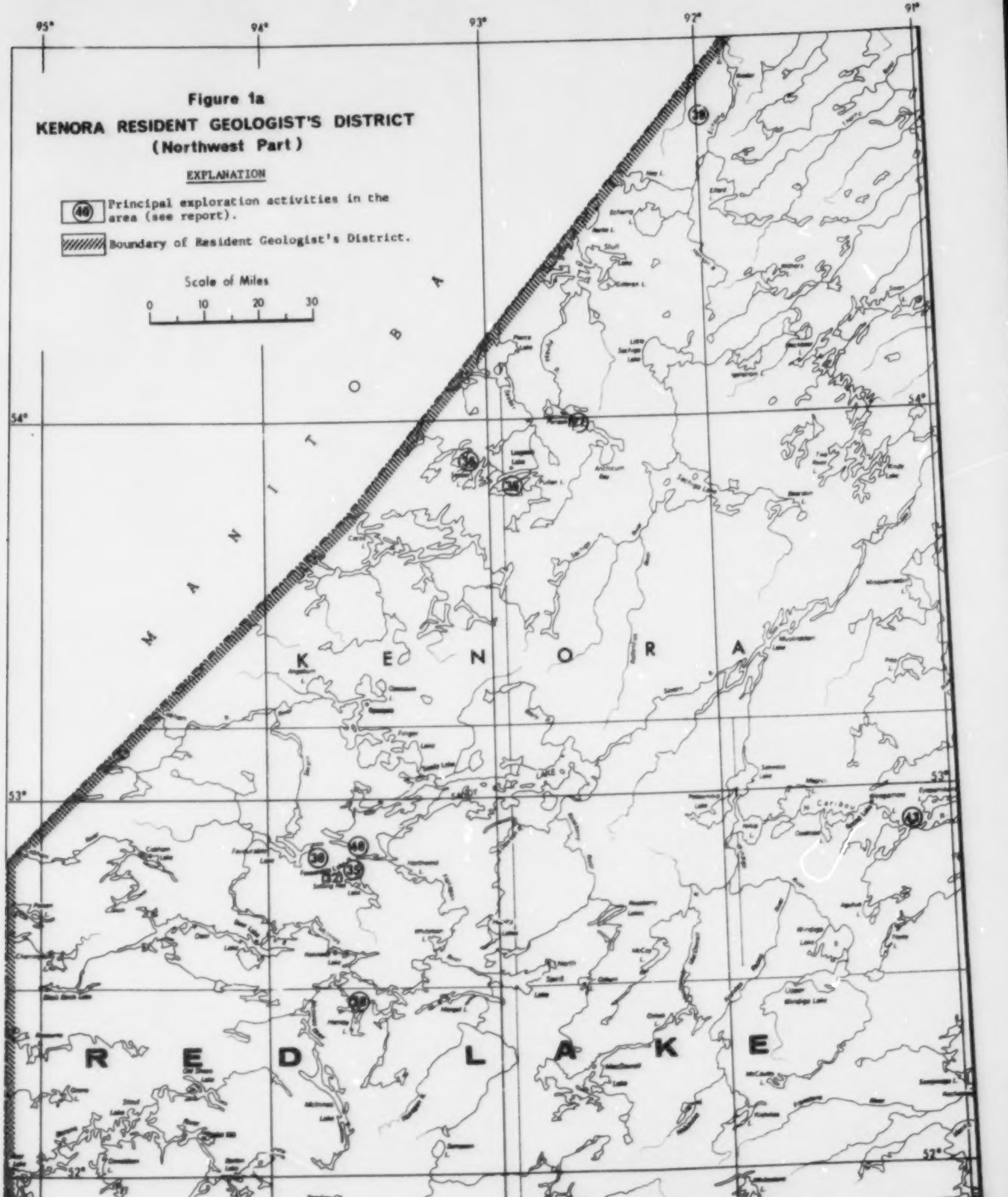

Figure 1a

KENORA RESIDENT GEOLOGIST'S DISTRICT
(Northwest Part)

EXPLANATION
46 Principal exploration activities in the area (see report).
Boundary of Resident Geologist's District.
Scale of Miles
0
10
20
30
95°
94°
93°
92°
91°
54°
53°
52°
MANITOBA
KENORA
RED LAKE
Adjoins Figure 1b

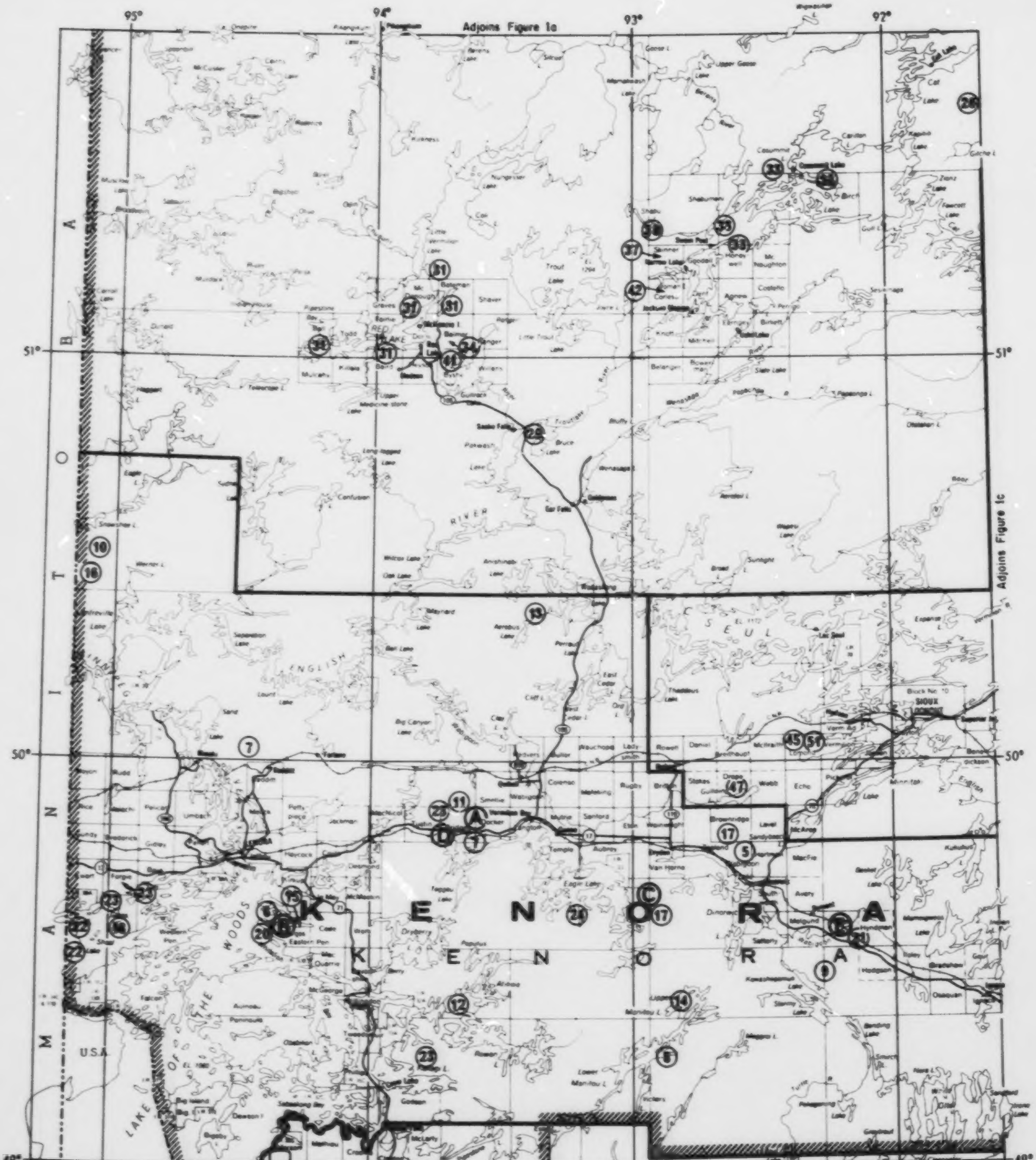
Adjoins Figure 1c
Adjoins Figure 1c
95°
94°
93°
92°
51°
50°
49°
93°19'
M A N I T O B A
K E N O R A
K E N O R A
ENGLISH RIVER
LAC SEUL
LAKE OF THE WOODS
RAINY RIVER
R A I N Y
U.S.A.
Scale of Miles
0
10
20
30
.ODM 4272, MP.16

Figure 1b

KENORA RESIDENT GEOLOGIST'S DISTRICT
(Southwest Part)

EXPLANATION

Ⓐ Properties examined by Resident Geologist, 1967 (see report).

⑦ Principal exploration activities in the area (see report).

▨ Boundary of Resident Geologist's District.

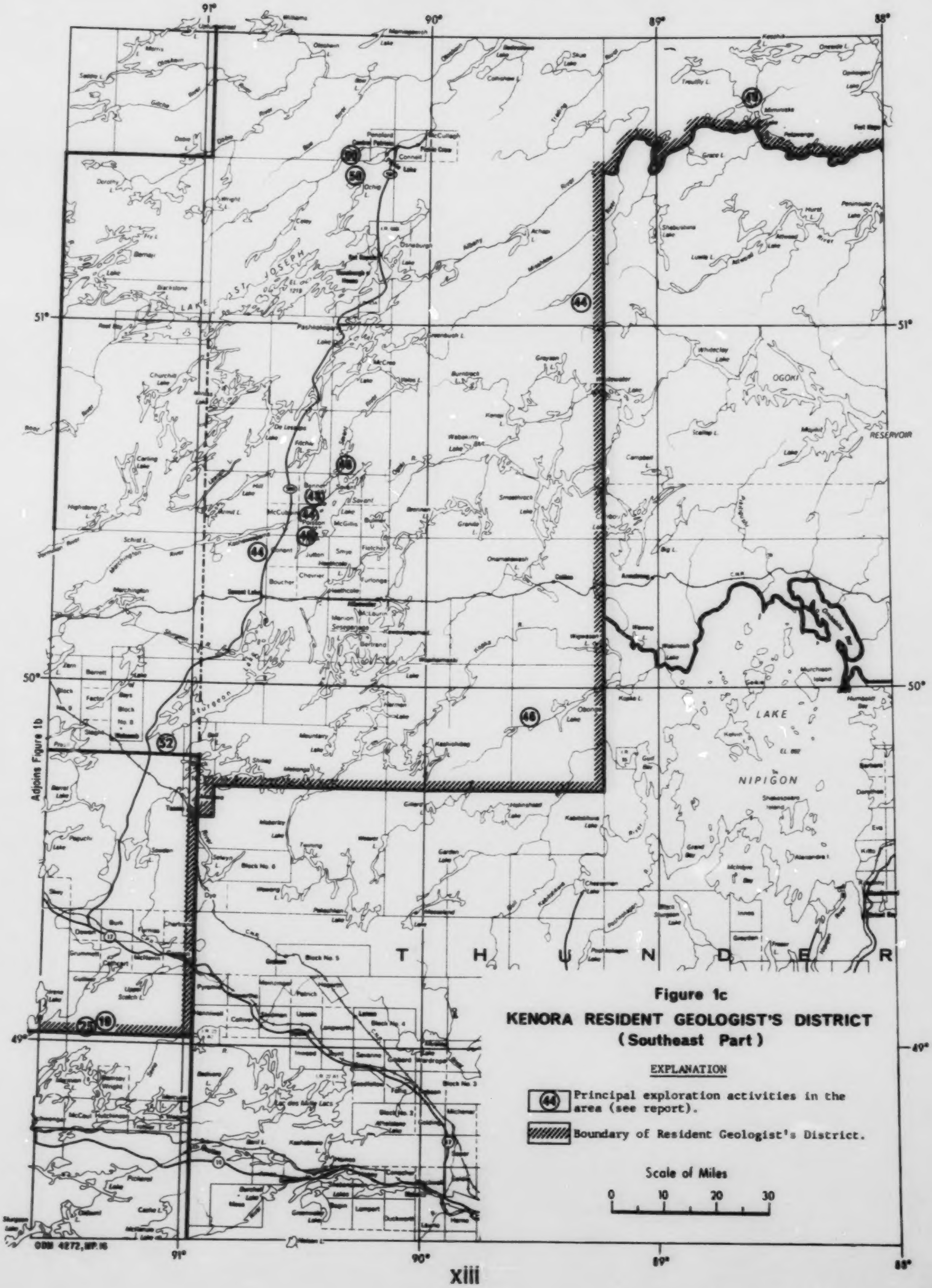

Figure 1c

KENORA RESIDENT GEOLOGIST'S DISTRICT

(Southeast Part)

EXPLANATION

(44) Principal exploration activities in the area (see report).

▨ Boundary of Resident Geologist's District.

Scale of Miles
0
10
20
30
91°
90°
89°
88°
51°
50°
49°
LAKE ST. JOSEPH
OGOKI RESERVOIR
LAKE NIPIGON
T H U N D E R
Adjoins Figure 1b
ODM 4272, MP.16

KENORA DISTRICT

by

J. C. Davies[1]

Introduction

Mineral exploration in the Fort Frances, Kenora, Patricia and Red Lake Mining Divisions was widespread during 1967. In most parts of the area activity was greater than in the previous year, partly due to the revival of interest in uranium occurrences, but also due to increased interest in the base metal potential of the area. A number of new discoveries were explored during the year.

Gold production in 1967 was less than the previous year due to the 1966 closing of the mines at Pickle Crow and McKenzie Island. The aggregate value of production from the five presently operating gold mines in Red Lake was about the same as in 1966. Copper and nickel production from the mine of Consolidated Canadian Faraday at Gordon Lake was similar to 1966 production.

Development of Griffith mine of Calmor Iron Bay Mines Ltd. at Bruce Lake continued through 1967. Some iron ore was stockpiled. Railway and gas line construction to the property was completed, and mill tune-up operations commenced. Production of pellets is scheduled for early 1968.

---

[1] **Resident Geologist, 203 Main St. South, Kenora, Ontario. Manuscript received by The Director, Geological Branch, 15 Jan. 1968.**

Activities of the Resident Geologist

Much of the Resident Geologist's time was devoted to routine matters such as improvement of the filing system, consultation, correspondence and meeting with prospectors and geologists. Public enquiries into uranium occurrences were particularly heavy during the last four months of the year. Throughout the year a compilation of all data in the files, similar in format to the recent "Register of Assessment Work" (Miscellaneous Paper 13) was being made in the office. An alphabetical list of all lake names shown on N.T.S. sheets of the area is on file in the office.

Mr. A.P. Pryslak, under supervision of the Resident Geologist, completed two preliminary compilation sheets. Final amendments of the Kenora-Fort Frances compilation sheet (Map 2115) were made early in the year. In addition, work associated with the Sioux Lookout-Armstrong and Red Lake-Trout Lake compilation sheets was continued. The report on the Fort Frances Area (Open File Report 5013) was completed and work on the Atikwa Lake Area report commenced.

Four O.D.M. survey parties were located in the area served by the Resident during the 1967 field season. All were visited by the Resident and two weeks were spent on Operation Lingman Lake. In addition, further mapping in the Atikwa Lake area was undertaken and some of the new discoveries in the Kenora District were examined.

Mineral exploration classes were held at Cochenour during the first week of April. An average of 60 attended the main series of geological lectures given by L.D. Ayres and the writer during the first four days. Red Lake mine geologists and management, together with the O.D.M. mining recorder and geologists lectured on various aspects of geophysics, geochemistry and practical prospecting during the final two days of classes.

Eight Junior Ranger camps, located in the Patricia, Kenora and Fort Frances Mining Divisions were visited by the Resident Geologist. Lectures were given to promote understanding of, and interest in, the geological sciences. In keeping with the resident's opinion that technical and professional manpower shortages in the mining industry stem in part from ignorance of the earth sciences, efforts have been made to promote the teaching of appropriate courses at the high school and community college levels.

Description of Properties Examined by the Resident Geologist

Coulee Lead and Zinc Mines Ltd.

(A, on Fig. 1.)

Following aerial radiometric surveys, Coulee Lead and Zinc Mines Ltd. staked a number of claim groups in the vicinity of Kenora. Most of the ground follow-up has been confined to an area in eastern Bridges township, 40 miles east of Kenora and less than a mile north of Highway 17.

Metasedimentary rocks, intimately injected by granitic rocks, occur in east-central Bridges township. The uranium occurrences discovered by Coulee lie south of the main contact zone in a predominantly granitic area. East-west valleys parallel to the trend of banding in the metasedimentary rocks probably represent fault zones.

Numerous trenches have been blasted at the main showings, 2000 feet south of the east end of Game Lake. The predominant granitic rock here contains very large feldspars in a medium-grained matrix and is considered to be a recrystallized crushed granite. Other rocks present are a medium-to coarse-grained pink granite, a grey pegmatitic phase containing biotite, and grey paragneiss. Slip surfaces oriented in many directions occur in these granitic rocks, and in the recrystallized rock and the biotite pegmatite these slip planes commonly contain carnotite. No primary uranium minerals have been distinguished to date but yellow thorite has been identified in coarse pink granite.

About 1500 feet east-southeast of the main showing another zone of carnotite-bearing slip surfaces has been found and some trenches have been sunk. Highest values appear to occur in coarse biotite pegmatite. Assays of grab samples from the two zones are reported to be from about one to seven lbs. U_3O_8 per ton. Additional work on the claim group is planned for 1968.

K. G. Ellard (1966) Grubstake Syndicate

(B on Fig. 1)

Working along strike of a chalcopyrite-bearing zone in the French Narrows area of the Lake of the Woods, K.G. Ellard has uncovered similar mineralization in an almost identical geological setting. The more recent find is about 5 miles east of French Narrows and 15 miles southeast of the town of Kenora.

Felsic to mafic metavolcanic rocks trend approximately east-west along Eastern Peninsula and are cut more or less concordantly by gabbro (O.D.M. Map P401). Within the mafic metavolcanic rocks more siliceous material occurs, some of which resembles cherty sediments. Immediately east of French Narrows Norlex Mines Ltd. has exposed copper mineralization in the cherty rock lying close to a gabbroic body. The Ellard Syndicate showing is also in cherty sediments and lies close to a dioritic body. Several trenches and pits have been blasted into the sulphides and a magnetometer survey has been completed.

Pyrite, pyrrhotite and chalcopyrite are the principal sulphides but a little galena has been found. The sulphides occur in thin seams parallel to bedding planes and in shears and cross fractures along a zone which has been traced about 500 feet. Chip samples taken from the original trench are reported to assay 1.25% Cu across 12 feet or 1.49% Cu across 8 feet. The percentage of chalcopyrite in the other trenches is estimated to be lower. Plans for further work have not been announced.

Kozowy Property

(C on Fig. 1)

Several occurrences of copper and nickel mineralization have been found in the vicinity of Nabish Lake, about ten miles southwest of Dryden. The most recent find is on claims staked by A. Kozowy of Dryden.

An irregularly shaped gabbroic body has invaded intermediate to mafic metavolcanic rocks and has in turn been truncated on the east by granodiorite (O.D.M. Map 2115). Sulphides occur in places within the gabbro and near its edges. The Kozowy property is underlain by metavolcanic rocks, with the sulphides occurring along a north-trending breccia zone composed of sub-rounded andesitic fragments in a coarser dioritic matrix. The zone appears to be about 150 feet wide and may possibly lie between two north-south faults.

Bedding planes in nearby agglomerate strike east-west.

A number of test pits have been sunk in the breccia zone. Sulphides are mostly nickeliferous pyrrhotite with less chalcopyrite and pyrite and minor pentlandite. The sulphides occur predominantly in the gabbroic matrix of the breccia and are also concentrated along intertwining slip planes. Further work is planned for 1968.

Noranda Mines Ltd., Bridges Township

(D on Fig. 1)

Prospectors employed by Noranda Mines Ltd., working in the area of a number of recent uranium discoveries, have located a zone of zinc mineralization. The showing is 35 miles east of Kenora and one quarter mile north of Highway 17.

The south edge of a belt of metavolcanic and metasedimentary rocks is poorly defined due to the variable proportion of granitic rocks which have been intruded. Metasediments are the predominant rock type on the Noranda property, but numerous concordant and discordant dikes of granite and pegmatite were noted. Prominent east-west lineaments in the area are interpreted as fault zones. The mineralized zone lies in a sheared and recrystallized quartzite or quartz vein bounded on the south by garnetiferous sediments. Two trenches have been sunk exposing a mineralized width of just over twenty feet. Muskeg lies to the north of the trenches.

Sphalerite and pyrite are the main sulphide minerals. Minor galena and chalcopyrite also occur in places and magnetite is common near the south contact. Mineralization is disseminated in the siliceous rock and massive along shear planes. Chip samples across a twenty-foot width contained about one-half percent zinc and one-half ounce of silver per ton. Further work on the property is anticipated in 1968.

Pidgeon Property, Revell Township

(E on Fig. 1)

Late in 1966, G.L. Pidgeon of Wabigoon discovered copper and nickel mineralization in hornblende diorite, about one mile west of Tache and 30 miles east-southeast of Dryden. Some trenching was done on the one small exposure and a program of diamond drilling was commenced in 1967.

Hornblende diorite in the vicinity of Tache occurs as relatively narrow zones between mafic metavolcanic rocks and a granodiorite batholith (O.D.M. Map 1960h). At the property a darker phase of the diorite is separated from a very feldspathic phase by a thin band of metavolcanics. The disseminated chalcopyrite and nickeliferous pyrrhotite is in the darker phase.

Six of eight holes drilled intersected the sulphides, which are confined to either a single zone or a series of lenses within the diorite. The zone appears to be about 10 - 15 feet wide and has a length of at least 400 feet and reportedly contains in excess of one percent combined copper and nickel. The drill results are inconclusive and further work is desirable.

Principal Exploration Activities in the Area

The following is a list of the principal exploration activities in each mining division of the area. Part of the information has been derived from the four Mining Recorders. The number preceding the name of the company or individual refers to the location map. The two numbers following the name are the Kenora office file number and the N.T.S. number respectively. The letter "X" following the Kenora file number denotes that some data has already been filed for the exploration activity listed, but does not refer to data received on exploration prior to 1967.

Fort Frances Mining Division

Claims staked in the whole division during 1967 were down considerably from 1966. West of Rainy Lake, however, an increase resulted from the mild rush in Potts township.

1. E. CORRIGAN (FF34, 52C/13) Trenching and diamond drilling of molybdenite-bearing mylonitized granite.

2. GREAT WEST MINING AND SMELTING CORP. LTD. (FF15, 52C/12) Further studies reported relative to marketing pelletized iron.

3. MALONEY PROPERTY (FF56, 52C/14) Uranium occurrences south of Alexandria Bay have been restaked and further prospecting carried out.

4. NORANDA MINES LTD. (FF53, 52C/13) Geological and geophysical surveys of optioned copper occurrence near Off Lake.

Kenora Mining Division

During 1967, 1710 claims were recorded, a decrease of about 8% from 1966. Exploration, however, appears to be more widespread than in 1966.

5. ALGOMA STEEL CORP. LTD. (K110 X, 52E/15) Diamond drilling of the Zealand township iron formation completed the exploration program commenced in 1966.

6. AUGMITTO EXPLORATION LTD. (K49C X, 52E/9) Diamond drilling on the French Narrows area property.

7. COULEE LEAD AND ZINC MINES LTD. (K78A, 52L/2) Airborne radiometric survey and (K116, 52F/13) airborne and ground radiometric surveys, magnetometer survey and trenching.

8. DAERING EXPLORERS CORP. LTD. (K57 X, 52F/7) Airborne magnetometer survey.

9. DOME EXPLORATION (CANADA) LTD. (K48 & 77 X, 52F/8) Stripping and trenching undertaken on ground surveyed

geochemically in 1966.

10. DOMINION EXPLORATION SYNDICATE (KRL78 X, 52L/11) Airborne magnetometer survey in the Wilson Lake area.

11. FALCONBRIDGE NICKEL MINES LTD. (K115, 116 X, 52F/13) Follow-up of 1966 geophysical surveys continued in northern Bridges and Docker townships.

12. GAUTHIER-NILSON PROPERTY (K2, 52F/5) Prospecting and an I.P. survey were carried out on the Denmark Lake patented claim group.

13. JENSEN PROPERTY (K1, 52K/6) Uranium occurrences at Aerobus Lake have been restaked and further prospecting carried out.

14. KERR ADDISON MINES LTD. (K56, 52F/7) After setting up an exploration office in Kenora, this company commenced air and ground geophysical surveys and a diamond drill program in the Upper Manitou Lake area.

15. K. G. ELLARD (1966) GRUBSTAKE SYNDICATE (K49C, 52E/9) Prospecting and ground geophysical surveys.

16. KNAPPETT PROPERTY (KRL78 X, 52L/6) Prospecting and ground geophysical surveys at Reynar Lake.

17. KOZOWY PROPERTIES (K110, 52F/15) Trenching of a silver-bearing quartz vein and (K28, 52F/10) trenching of a copper and nickel bearing breccia.

18. MACHIN PROPERTY (K36 X, 52E/10) Diamond drilling east of the old Olympia Gold Mine.

19. NORANDA MINES LTD. (K39 X, 52G/3) Ground geophysical surveys and prospecting. (K116, 52F/13) Prospecting and trenching.

20. NORLEX MINES LTD. (49C X, 52E/9) Diamond drilling was done by Canadian Javelin under option agreement.

21. PIDGEON PROPERTY (K80 X, 52F/9) Stripping, trenching and diamond drilling of copper-nickel occurrence.

22. SALEM EXPLORATION LTD. (K36 X, 52E/11) Airborne magnetometer survey of the western Shoal Lake area.

23. SELCO EXPLORATION COMPANY LTD. (K36 X, 52E/10) Diamond drilling, (K34 X, 52E/10) Diamond drilling, (K116 X, 52F/13) Diamond drilling, and (K46, 52F/4 & 5) Follow-up of airborne geophysical survey.

24. SUKAVA PROPERTY (K28, 52F/11) Stripping and trenching of copper occurrence at Meridian Bay.

25. WEMCO MINING CO. LTD. (K39, 52G/3) Trenching of copper occurrence east of Red Paint Lake.

Red Lake Mining Division

In 1967, 2376 claims were recorded, about the same as in 1966. Activity was widespread.

26. ALGOMA STEEL CORP. LTD. (RL68 X, 520/12) Ground magnetometer survey, Lang Lake area.

27. ASARCO EXPLORATION COMPANY OF CANADA LTD. (RL100, 53F/15) Geological survey and prospecting, Ponask Lake area. (Ref. O.D.M. Misc. Paper No. 11, p. 8).

28. ASBESTOS CORPORATION LTD. (RL96, 53C/5 & 12) Geological investigations in the Hornby Lake area.

29. CALMOR IRON BAY MINES LTD. (RL55, 52F/14) Open pit development and mill construction.

30. CAM MINES LTD. (RL96 X, 53C/13) Airborne radiometric survey, trenching and drilling in Favourable Lake area.

31. COCHENOUR WILLANS GOLD MINES LTD. (RL6 X, 25 X, 47 X, 66 X, 76 X, 52N/4) A major diamond drilling program was continued at Red Lake and (RL3, 52, 52M/1) Drilling of a copper-zinc occurrence at Trout Bay resumed.

32. CONWEST EXPLORATION CO. LTD. (RL96, 53C/13) Radiometric survey and prospecting in the Favourable Lake area.

33. DOME EXPLORATION (CANADA) LTD. (RL16 X, 52N/8) Diamond drilling in the Casummit Lake area and (RL37 X, 64 X and 65 X, 52N/7) Drilling in the Shabumeni Lake area.

34. DICKENSON MINES LTD. (RL4 X, 52N/4) Diamond drilling in south Balmer township.

35. GOLSIL MINES LTD. (RL96, 53C/13) Power house reconstructed and underground exploration resumed.

36. INTERNATIONAL MINERALS AND CHEMICAL CORP. (CANADA) LTD. (RL99 X & 100 X, 53F/14 & 15) Ground electromagnetic and geological surveys, prospecting, trenching and diamond drilling, part of a major exploration program commenced in 1966. (Ref. O.D.M. Misc. Paper No. 11, p. 5).

37. JONES PROPERTY (RL69 X, 52N/7) Ground electromagnetic

survey and diamond drilling at Bathurst Lake.

38. MADSEN RED LAKE GOLD MINES LTD. (RL65 X, 52N/7) Trenching and diamond drilling at Shabu Lake and (RL97, 53C/7) examination of magnetic sands at McDowell Lake.

39. M. J. BOYLEN ENGINEERING OFFICES. (RL101, 53K/16) Geological examination of carbonatite area (Ref. O.D.M. Misc. Paper No. 11, p. 8).

40. NORTH ROCK EXPLORATIONS LTD. (RL96 X, 53C/13) Diamond drilling at South Trout Lake.

41. PETERSON RED LAKE MINES LTD. (RL15 X, 52N/4) Stripping, trenching and diamond drilling at Chukuni River.

42. PHELPS DODGE CORPORATION OF CANADA LTD. (RL21, 52N/2) Geological investigations in Coreless township.

43. PYROTEX MINING AND EXPLORATION CO. LTD. (RL98 X, 53B/14). Stripping, trenching and diamond drilling at Weagamow Lake.

Patricia Mining Division

A total of 2008 claims was recorded in the Patricia Mining Division in 1967. This includes claims staked in the former Kowkash Division so that a direct comparison with 1966 cannot be made.

44. ALGOMA STEEL CORP. LTD. (PA73 X & 74 X, 52J/7 &8) Ground magnetic survey in the Savant Lake area and also (PA73 X 52J/7) in the Kashaweogama Lake area. In the Greenmantle Lake area (PA79 X, 52P/3) ground magnetic surveys were followed

by diamond drilling.

45. ASARCO EXPLORATION OF CANADA LTD. (PA31 X, 52K/1) Diamond drilling in Lomond township.

46. COMMERCE NICKEL MINES LTD. (PA70, 52H/13) Reached agreement with Newmont Mining Corp. for further work on the Puddy Lake property.*

47. CONWEST EXPLORATION CO. LTD. (PA37, 52F/15) Radiometric survey of the Bluett Lake area.

48. INTERNATIONAL NICKEL CO. OF CANADA LTD., THE (PA74 & 76, 52J/7, 8 & 9) Geological examination in Savant Lake area.

49. MATTAGAMI MINING CO. LTD. (PA82 X, 52P/10) Concentration tests of 1966 drill cores completed.

50. NORTH AMERICAN VENTURES LTD. (PA78 X & 80 X, 520/7 & 8) Airborne and ground geophysical surveys in the Pickle Lake area.

51. PHELPS DODGE CORP. OF CANADA LTD. (PA31, 52K/1) Geological investigations in Lomond township.

52. STEEROLA EXPLORATIONS LTD. (PA54 X, 52G/14) Geological, geochemical and geophysical surveys, stripping, trenching and diamond drilling in the Beidelman Bay area of Sturgeon Lake.

* Field examinations in this area have been made by the Resident Geologist at Port Arthur.

New Information Added To The Files In 1967

The following is a list of data, most of which was filed for assessment credit, received by the office during 1967. The abbreviations are the same as those used in O.D.M. Miscellaneous Paper 13 "Register of Assessment Work" with the addition of the number of drill holes in brackets. Abbreviations used are Air R - Airborne radiometric, DD - Diamond drilling, GC - Geochemical survey, GL - Geological survey, GP - Geophysical survey, mag - magnetic survey, S - Beneficiation tests, ST - Trenching.

ALGOMA STEEL CORP. LTD.	
Greenmantle Lake PA 79*	GP, DD (10)
Kashaweogama Lake PA 73	GP
Lang Lake RL 68	GP
Savant Lake PA 74	GP
Zealand township K 110	GL, GP, DD (1)
ASARCO EXPLORATION CO. OF CANADA LTD.	
Swain Lake RL 64	GL, GP
Lomond township PA 31	DD (3)
AUGMITTO EXPLORATION LTD., Manross twp. K 49 C	GP, DD (3)
CAM MINES LTD., Favourable Lake RL 96	Air R, DD (10)

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* File No. at Resident Geologist's Office, Kenora.

COCHENOUR WILLANS GOLD MINES LTD.	
East Red Lake (52N/4) RL 6, 25, 47, 66, 76	DD (37)
West Red Lake (52M/1) RL 3, 52	DD (3)
Bamaji Lake PA 2	DD (19)
COPCONDA MINES LTD., French Narrows K 49 C	GP
DAERING EXPLOREERS CORP. LTD.	
Lower Manitou Lake K 57	Air mag.
DOME EXPLORATION (CANADA) LTD.	
Casummit Lake RL 16	DD (10)
Shabumeni Lake RL 37, 64, 65	DD (8)
Mennin Lake K 48, 77	GC
DOMINION EXPLORATION SYNDICATE	
Wilson Lake RL 78	Air mag.
DUPORT MINING COMPANY, Shoal Lake K 36	DD (2)
FALCONBRIDGE NICKEL MINES LTD.	
Cobble Lake K 115, 116	GP
GRAY PROPERTY, Seeber Lake RL 99	DD (1)
GRIMSHAW PROPERTY	
East of Birch Lake RL 9	DD (7)
HANNA MINING CO., Miniss River PA 73	GP
INTERNATIONAL MINERALS AND CHEMICAL CORP. LTD.	
Seeber Lake RL 99, 100	Air mag. GL, GP, DD (12)

JOHNSON, E., PROPERTY, Seeber Lake RL 99	DD (4)
JOHNSON, J., PROPERTY, Ball twp. RL 3	DD (2)
JONES PROPERTY, Skinner twp. RL 69	GP, DD (1)
K. G. ELLARD (1966) GRUBSTAKE SYNDICATE Manross twp. K 49 C	GP
KNAPPETT PROPERTY, Reynar Lake RL 78	GP
MACHIN PROPERTY, Shoal Lake K 36	DD (1)
MADSEN RED LAKE GOLD MINES LTD. Shabu Lake RL 65	DD (10)
MATTAGAMI MINING CO. LTD. Mimmiska Lake PA 82	DD (2), S
McLEOD PROPERTY, Seeber Lake RL 99	DD (1)
NORANDA MINES LTD., Norway Lake K 39	GP
NORLEX MINES LTD., French Narrows K 49 C	GP, DD
NORTH AMERICAN VENTURES LTD., Pickle Lake PA 78, 80	GP
NORTH ROCK EXPLORATIONS LTD. South Trout Lake RL 96	DD (6)
PERSHLAND GOLD MINES LTD. Kashaweogama Lake PA 73	GP
PETERSON RED LAKE MINES LTD., Byshe twp. RL 15	DD (8)

PIDGEON PROPERTY, Revell twp. K 80	DD (8)
PYROTEX MINING AND EXPLORATION CO. LTD.	
Weagamow Lake RL 98	DD (4)
REXDALE MINES LTD., Fredart Lake RL 7, 77	GP, DD (1)
SALEM EXPLORATION LTD.	
Earngey township RL 24	Air mag.
Shoal Lake area K 36	Air mag.
SELCO EXPLORATION CO. LTD.	
Shoal Lake K 36	DD (5)
Forgie-Boys twps. K 34	DD (5)
Bridges twp. K 116	DD (1)
STEEROLA EXPLORATIONS LTD., Sturgeon Lake PA 54	GC, GL, GP, ST, DD (18)
STUPACK PROPERTIES, Ball-Mulcahy twps. RL 3	DD (4)
VICTORIA ALGOMA MINERAL CO. LTD.	
Turtlepond Lake K 103	GP
WOOD PROPERTY, Dome twp. RL 23	DD (1)

Summary

Kenora District

The steady rate of exploration for base metals is expected to continue through 1968 with several major companies involved in follow-up geophysical surveys. Increased activity for uranium may result from the recent discoveries along a belt extending from 30 miles east of Kenora to 20 miles southwest of Sioux Lookout. Two preliminary maps within this area are to be published early in 1968, and mapping in Bridges and Docker townships is scheduled for the summer of 1968.

Other recent publications pertaining to the area are the preliminary maps from Operation Lingman Lake, and the South Trout Lake, Fredart-Whitemud Lakes and Abram Lake areas (see Miscellaneous Paper No. 11, "Summary of Field Work, 1967" pages 3 - 19). A final map of the Kenora-Fort Frances compilation area was published in August 1967.

The planned roads extending north from Red Lake and Pickle Lake will encourage more exploration in the northern part of the area. Another area which may see greater activity is the English River gneiss belt, in which a number of uranium occurrences have been reported.

Port Arthur District

by

C.R. Kustra[1]

Summary

During 1967, seven metal mining operations were active and one operation quarried amethystine quartz. Two mines terminated operations in the year and three potential producers continued development and exploration. Re-evaluation, by underground diamond drilling and sampling, of a former gold producer and a former silver mine were undertaken during the year.

The Port Arthur Mining Division experienced a decrease in the number of mining claims recorded. Part of the Fort Frances Mining Division and the Kowkash section of the Patricia Mining Division recorded an increase in the number of claims staked. The increase in the latter division was due to a recent base metal discovery near Melchett Lake.

Exploration activity in the district has been relatively vigorous. Specifically, the Pigeon River district, approximately 25 miles southwest of Port Arthur, produced the greater portion of submitted assessment information.

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[1] Resident Geologist, 179 South Algoma Street, Port Arthur, Ontario. Manuscript received by The Director, Geological Branch, 22 Jan. 1968.

Introduction

The Port Arthur resident geologist's office is located at 179 South Algoma Street, at which address are found the offices of the Mining Recorder and Mines Inspection Branch.

The resident's office is staffed by a secretary and two field geologists of the Geological Surveys Section, F.R. Harris and P.C. Thurston. A third field geologist, K.G. Fenwick, is currently pursuing graduate studies leading to a Master's degree.

Office facilities include the following rooms: reception room, file and map room, four geologist's offices, drafting and photographic storage room, rock and mineral sample storage and instrument room, an area for general storage and a library.

All assessment data received by the resident geologist is filed and cross-indexed according to name of company or individual, mineral occurrence, National Topographic System location, township and claim map location. Suitable facilities, including a light table, are provided in the file room for public perusal of assessment information.

Library facilities include publications of the Ontario Department of Mines, publications of the Department of Mines and Technical Surveys, sundry mining magazines, geology textbooks and publications and a collection of several hundred 35 mm. colour slides illustrating rocks, minerals and structural and morphological geologic features. In addition, Federal-Provincial aeromagnetic maps at scales of one inch to one mile, one inch to four miles and one inch to sixteen miles are filed.

Scores of rock thin section slides from various field projects are in storage.

During the 1967 field season, six department field parties geologically mapped portions of the area. The reader is referred to the 1967 summary of field work[1] for field party locations.

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[1] Pye, E.G. (editor), Summary of Field Work, 1967 by the Geological Branch; Ontario Department of Mines, Miscellaneous Paper 11, November 1967.

Part 1: Activities of the Resident Geologist

During 1967, the resident geologist visited and collected information from five full-scale mining operations active during the entire year, two operations which terminated activity during the year, three properties engaged in exploration and development, two properties in which old workings were rehabilitated and mineralization examined, and one seasonal operation. Eight property examinations were conducted.

Several weeks were spent field mapping in the Obonga-Leigh Lakes area, a project initiated in 1966 and concluded in 1967 by P.C. Thurston of the Departmental staff[1]. F.R. Harris and K.G. Fenwick, Departmental field geologists conducted mapping programs in the Moss Lake area and Finlayson Lake area, respectively.

Several of the Departmental field parties in the district were visited.

A visit to The International Nickel Company of Canada Ltd. property at Ely, Minnesota was undertaken in September. Accompanied by J.J. Geul, Departmental geologist mapping in the Pigeon River district, the resident geologist visited that company's shaft site where erection of a head-frame was nearing completion. The initial nickel discovery area was seen and samples of mineralized Duluth gabbro were collected.

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[1] Summary of Field Work, 1967, p. 39-31.

An overnight boat trip was undertaken to examine and collect samples of the geological formations outcropping on the offshore islands in Nipigon Bay of Lake Superior.

Mineral Exploration classes were conducted during the period January 30 to February 29, 1967. The resident geologist was assisted by Messrs. Harris and Thurston of the Department staff and the following guest lecturers: R.V. Oja, Mining Recorder J.C. Smith, J. Mothersill, T. Page, T. Cardle, C. Perry, A.Stewardson and members of the Lakehead Search and Rescue Unit.

One tour of the Department's mineral collection and office facilities was conducted.

Three conventions, The Prospectors and Developers Association, the Lake Superior Institute meetings and the Geological Association of Canada, were attended.

Much of the resident's time was devoted to administrative functions, chatting with numerous visitors, identifying rock and mineral samples and visiting the several exploration companies based at the Canadian Lakehead.

Part 2: Information Collected During 1967
Specimens Added to Rock and Mineral Display

(1) Assessment Data

All assessment data received by the resident geologist is filed and cross-indexed. In the file room, an assessment data index map at a scale of one inch to eitht miles is divided into rectangular sections, each section bearing an appropriate geographic name (see Fig.3). Incoming assessment information, falling within a specific geographic rectangle, is filed accordingly. Pages 29 to 33 summarize all assessment information received by the resident geologist during 1967.

(2) Mine Plans and Sections

During 1967 the resident geologist visited various mining operations and obtained the following data from each mine.

North Coldstream Mines Ltd.:	20-scale and 100-scale level plans, 100-scale cross-sections, summary of production statistics.
Noranda Mines Ltd., (Geco Division):	200-scale level plans and longitudinal section, 100-scale cross-section of ore zone.
Willecho Mines Ltd.: Willroy Mines Ltd.	100-scale composite plan, sundry sections and plans.

Zenmac Metal Mines Ltd.: 40-scale composite mine plan.

MacLeod-Mosher Gold Mines Ltd.: 200-scale level plans, 500-scale surface geology map, cross-sections, subsurface plans and longitudinal sections.

Tashota-Nipigon Mines Ltd.: surface geological map, 20-scale level plans, composite map of underground workings and sections, detailed ground magnetometer survey.

(3) Literature

Sundry maps and technical publications received during the year have been placed in the library. The reader's efforts in bringing to the attention of the local resident geologist various publications, expecially theses and other research projects concerned with his district, will be greatly appreciated.

(4) Specimens

A representative suite of specimens of host rock and ore have been collected from the following operations.

North Coldstream Mines Ltd.
Great Lakes Nickel Corp. Ltd.
The International Nickel Company
 of Canada Ltd., Shebandowan Mine.
MacLeod-Mosher Gold Mines Ltd.
Willroy Mines Ltd.
Willecho Mines Ltd.

Noranda Mines Ltd., (Geco Division)
Great Lakes Silver Corp. Ltd.
Zenmac Metal Mines Ltd.
Tashota-Nipigon Mines Ltd.

Several individuals kindly donated various mineral samples. In addition to specimens found locally, these include minerals from Bolivia and Ireland.

Summary of Assessment Data Filed with Resident Geologist, 1967

Explanation

* Refer to District Map showing locations of areas.
** D.D.H. - Diamond drill holes; no. of holes drilled followed by total footage.
MAG. - Magnetometer survey
E.M. - Electromagnetic survey
I.P. - Induced Polarization survey
RES. - Resistivity survey
(Zinc) - Metal detected.

Port Arthur Mining Division

Company or Individual	Area Location*	N.T.S.	Township	Assessment Data**
Algoma Ore Properties Ltd.	Black Sturgeon	52H2/NW		Ground MAG. 3 D.D.H.-329'
Falconbridge Nickel Mines Ltd.	Black Sturgeon	52H3/SE		I.P. (Copper)
Anaconda American Brass Ltd.	Block Creek	52H4/NE		3 D.D.H.-1754' (Copper, Nickel, Platinum, Palladium)
International Nickel Co. of Canada Ltd., The	Block Creek	52H3/SW/SE 52H3/NW		5 D.D.H.-1382' 3 D.D.H.-500'
Hannam Expl. Ltd.	Duck Lakes	42D14/SE	84	Ground MAG
Zenmac Metal Mines Ltd.	Duck Lakes	42D14/NW	84	5 D.D.H.-1550' (Copper)
Anaconda American Brass Ltd.	Heron Bay-White L.	42D16/SW		2 D.D.H.-864' (Copper)
Caravelle Mines Ltd.	Heron Bay-White L.	42C13/SW		Ground MAG 6 D.D.H.-2767'
Willroy Mines Ltd.	Heron Bay-White L.	42D16/NW		Ground E.M. Geological map
Noranda Expl. Co. Ltd.	Hogarth-Upsala	52G2/SW	Hanniwell	4 D.D.H.-1473'
Obaska Lake Mines Ltd.	Jackfish-Middleton	42D15/SE	80	Ground MAG (Iron)
Creswel Mines Ltd.	Kakabeka	52A5/SE	Gillies O'Connor	Consultant's report, Geological map, Assay plans and sections (Silver)
Noranda Expl. Co. Ltd.	Kakabeka	52A5/NW	Adrian	4 D.D.H.-1055'
McWilliams	Kakabeka	52A5/SE	Paipoonge	2 D.D.H.-508.5' (Silver)
International Nickel Co. of Canada Ltd., The	Kaministikwia	52A12/SE	Conmee	1 D.D.H.-544'
Noranda Expl. Co. Ltd.	Kaministikwia	52B12/SW	Horne Laurie	1 D.D.H.-218'
Kerr Addison Mines Ltd.	Lac Des Mille Lacs	52B16/SW 52B15/SE		Ground E.M. (Copper, Gold)
Midland Nickel Corp. Ltd.	Lac Des Mille Lacs	52B15/SW		Prospectus 7 D.D.H.-1920'
Rocky Brook Mines Ltd.	Lac Des Mille Lacs	52B15/SW		Prospectus Ground MAG
Hanna Gold Mines Ltd.	Lac Des Mille Lacs	52B15/SW		1 D.D.H.-500'
Cantri Mines Ltd.	Lac Des Mille Lacs	52B15/SW		Ground E.M., MAG 3 D.D.H.-1502'

Port Arthur Mining Division
(Cont)

Company or Individual	Area Location*	N.T.S.	Township	Assessment Data**
Crooked Green Creek Mines Ltd.	Little Long Lac-Sturgeon River	42E13/SW	Pipher	Prospectus Geological Report (Copper, Gold)
Garvey, W.	Little Long Lac-Sturgeon River	42E13/SE	Elmhirst	3 D.D.H.-668' Assays for Zinc
Holm, Mrs. H.W.	Little Long Lac-Sturgeon River	42E10/NW		1 D.D.H.-134'
Norlex Mines Ltd.	Little Long Lac-Sturgeon River	42E13/SE 42E13/SW	Elmhirst Pipher	19 D.D.H.-7515' Copper, Gold, Silver Assays
Nortoba Mines Ltd.	Little Long Lac-Sturgeon River	52H9/NE	Dorothea	Geological Report, Map. (Molybdenum, Gold)
Oremond Gold Mines Ltd.	Little Long Lac-Sturgeon River	42E12/NE		Ground E.M.
Raejac Expl. Ltd.	Little Long Lac-Sturgeon River	42E13/SE		Geological Report
Sijpkens-Jones	Little Long Lac-Sturgeon River	42E12/NW	Summers	Ground MAG (Gold)
Tyson, A.E.	Little Long Lac-Sturgeon River	52H9/NE	Dorothea	9 D.D.H.-2286' Molybdenum assays, Trench, strip and section plans.
Algoma Ore Properties Ltd.	Longlac Pagwachuan	42E9/SW		Ground MAG (Iron)
Consolidated Morrison Expl. Ltd.	Longlac-Pagwachuan	42E16/SW		Airborne E.M., MAG.
Barker, R.	Loon Lake	52A10/NE	McTavish	13 D.D.H.-1825' (Copper)
Monarch Gold Mines Ltd.	Loon Lake	52A7/SE		4 D.D.H.-1018' (Silver)
Falconbridge Nickel Mines Ltd.	Manitouwadge	42E1/SE 42E1/SW		9 D.D.H.-2397' Ground MAG.
Geco Mines Ltd.	Manitouwadge	42F4/NE	Gemmell	2 D.D.H.-800' Geological Report
Grandroy Mines Ltd.	Manitouwadge	42F1/NE	Davies	Ground MAG.
Man-Echo Mines Ltd.	Manitouwadge	42F4/NW	Mapledoram	4 D.D.H.-1379' I.P.
Sperle Option (Falconbridge Nickel Mines Ltd.)	Manitouwadge	42F4/NE		Ground MAG., I.P. (Copper)
Western Equities Inc.	Manitouwadge	42E1/NE		Ground E.M.
Willroy Mines Ltd.	Manitouwadge	42F4/NW 42F4/NW	Gemmell Mapledoram	1 D.D.H.-916' Ground MAG of Willecho property
Palomino Expl. Ltd.	Onaman South	42E13/NE		Geological report Airborne E.M.
Anaconda American Brass Ltd.	Pigeon River	52A4/SE	Pardee	2 D.D.H.-980' (Copper, Nickel)
Bahleida, A.	Pigeon River	52A3/SW	Crooks	1 D.D.H.-104' (Copper, Nickel)
Bordun Mining Corp.	Pigeon River	52A4/SE	Pardee	Prospectus Geological Report Ground MAG. 5 D.D.H.-3645' (Copper, Nickel)

Port Arthur Mining Division
(Cont)

Company or Individual	Area Location*	N.T.S.	Township	Assessment Data**
Bretton Mines Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus Progress report, 3 D.D.H.-2004'
Copperville Mining Corp. Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus
Grassett Lake Mines Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus
Great Lakes Nickel Corp. Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus
Hanna Gold Mines Ltd.	Pigeon River	52A4/SE	Pardee	2 D.D.H.-1813'
Lake Superior Corp. Ltd.	Pigeon River	52A4/SE	Pardee	1 D.D.H.-623'
Noranda Expl. Co. Ltd.	Pigeon River	52A4/SE	Pardee	3 D.D.H.-556'
Northville Expl. Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus
Pine River Mines Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus
Rhonda Copper Mines Ltd.	Pigeon River	52A3/SW	Crooks	Geological Report
Thunder Bay Nickel Mining Corp. Ltd.	Pigeon River	52A4/SE	Pardee	Prospectus
Whitegate Mining Co.	Pigeon River	52A3/SW	Crooks	Ground MAG 3 D.D.H.-1671' (Copper, Nickel)
Can-Fer Mines Ltd.	Shebandowan Lakes	52B7/NW	Moss	Ground MAG., I.P. (Copper)
Consolidated Mining and Smelting Co. Ltd.	Shebandowan Lakes	52B7/NW 52B10/SW 52B10/SE	Moss Moss Moss	Airborne MAG 9 D.D.H.-2932' (Copper, Zinc, Gold, Silver)
Executive Expl. Ltd.	Shebandowan Lakes	52B9/SW		Prospectus
Federal Resources Corp.	Shebandowan Lakes	52B9/NW		Ground MAG., E.M.
International Nickel Co. of Canada Ltd., The	Shebandowan Lakes	52B9/SE	Duckworth	1 D.D.H.-404'
		52A5/NW 52A12/SW	Adrian) Horne)	3 D.D.H.-2010'
		52A12/NW	Blackwell	4 D.D.H.-987'
		52A9/NE	Conacher	1 D.D.H.-647'
		52B9/SW	Begin	2 D.D.H.-90'
Marlboro Mines Ltd.	Shebandowan Lakes	52B9/SW	Haines	Ground MAG., E.M. 3 D.D.H.-900'
McIntyre Porcupine Mines Ltd.	Shebandowan Lakes	52B9/NW	Haines	Ground E.M. Geochemical Survey (Copper, Nickel)
Pine River Mines Ltd.	Shebandowan Lakes	52B9/NW	Haines	Ground E.M., MAG.
Seemar Mines Ltd.	Shebandowan Lakes	52B9/NW	Haines	Prospectus
Shawmin Expl. Ltd.	Shebandowan Lakes	52B9/NW	Haines	Prospectus Geological Consultant's Report Ground MAG., E.M. 5 D.D.H.-1074' (Copper, Nickel)
Shield Development Co. Ltd.	Shebandowan Lakes	52B10/SW	Moss	Geological report, map Ground MAG., E.M.

Fort Frances Mining Division

Company or Individual	Area Location*	N.T.S.	Township	Assessment data**
Almada Expl. Ltd.	Atikokan	52B14/SW	McCaul	4 D.D.H.-1029' (Molybdenum)
Anjamin Mines Ltd.	Atikokan	52B14/SW	Hutchinson	9 D.D.H.-1649' (Gold, Silver)
Burrex Mines Ltd.	Atikokan	52B14/NW		Consultant's Report
Canadian Addicks Mining Corp.	Atikokan	52B13/NE		Ground MAG., E.M. (Copper)
Cyprus Expl. Ltd.	Atikokan	52B13/NE		Ground MAG., E.M.
Green Valley Mines Ltd.	Atikokan	52B14/SE	Weaver	Prospectus
Kuhner, K.	Atikokan	52B13/NE		11 D.D.H.-5364'
Morehouse, W.D.	Atikokan	52B13/NE		5 D.D.H.-844'
Sapawe Gold Mines Ltd.	Atikokan	52B14/SW	McCaul	1 D.D.H.-125'
Terra Riche Mines Ltd.	Atikokan	52B10/NE 52B11/NE 52B14/SE		Prospectus
Noranda Expl. Co. Ltd.	Mine Centre	52C16/SW		Ground E.M.
Rhonda Copper Mines Ltd.	Mine Centre	52C10/NE 52C15/SE		Prospectus 5 D.D.H.-2469' (Copper, Lead, Zinc, Silver)
Selco Expl. Ltd.	Mine Centre	52C10/NE	Farrington	2 D.D.H.-1074' (Trace Copper, Zinc)
Consolidated Mining and Smelting Co. Ltd.	Rainy Lake	52C11/NE	Halkirk Watten	Geological Report Ground MAG., I.P., RES.
Corrigan, E.	Rainy Lake	52F4/SE		7 D.D.H.-2026'
Galbraith, J.	Rainy Lake	52C11/NE	Watten	6 D.D.H.-506' (Copper, Nickel)
Noranda Expl. Co. Ltd.	Rainy Lake	52C11/NE	Halkirk	Ground E.M.
Paramaque Mines Ltd.	Rainy Lake	52C11/NE	Halkirk Watten	Ground MAG., E.M. Geological map 6 D.D.H.-2011.5' D.D.H. sections (Copper, Nickel, Gold Assays)
Weiss, B.	Rainy Lake	52C11/NE	Watten	1 D.D.H.-1026'

Patricia Mining Division
(Kowkash Section)

Company or Individual	Area Location*	N.T.S.	Township	Assessment data**
Algoma Ore Properties Ltd.	Caribou Lake	52I10/SW		5 D.D.H.-325' (Copper, Zinc)
Centurion Mines Ltd.	Caribou Lake	52I10/SW		7 D.D.H.-437.7' (Copper, Gold, Nickel Assays)
Algoma Steel Corp. Ltd.	Gzowski-Kowkash	42L3/NW 42L3/NW	Paska	5 D.D.H.-1796' 1 D.D.H.-402' (Iron)
Kendon Copper Mines Ltd.	Gzowski-Kowkash	42L5/NE		Prospectus includes geological map
Reid, G.	Gzowski-Kowkash	42L5/NE		4 D.D.H.-2002'
Elite Cobalt Mines Ltd.	Onaman North	42L4/SE		Ground MAG
Tashota Nipigon Mines Ltd.	Onaman North	42L4/SE		Geological Report (Copper, Gold)
Algoma Ore Properties Ltd.	Shabuskwia	52P3/NE 52P3/SE		 6 D.D.H.-2201' Ground MAG (Iron)
International Nickel Co. of Canada Ltd., The	Zig-Zag Lake	52I8/NW		2 D.D.H.-349'

Part 3: Mining Activity and Exploration

1. Port Arthur Mining Division

(a) Producing Mines

(1) MacLeod-Mosher Gold Mines Ltd. This company, formed by recent amalgamation of MacLeod-Cockshutt Gold Mines Ltd., Hard Rock Gold Mines Ltd., and Consolidated Mosher Mines Ltd., is the sole gold producer in the Beardmore-Geraldton gold district.

Ore is mined from the MacLeod and Mosher mines and milled at the MacLeod plant.

An underground visit was made to the mine and a representative suite of samples collected.

(2) Noranda Mines Ltd., (Geco Division). A copper-gold-silver-zinc producer, this mine is situated in the Manitouwadge base metal region. The geology of the mine has been described by Pye[1].

A complete suite of samples of host rock and ore were collected. These include members of the grey gneiss group, the sericite schist group, the granite gneiss group and the intrusives.

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[1] E.G. Pye, Geology of the Manitouwadge Area; Ontario Dept. Mines, Vol.66, pt.8, 1957, p. 81-88.

Ore reserves are 25,879,000 tons as of January 1, 1967 (Canadian Mines Handbook 1967-1968).

Mr. D.F. Whitford is acting chief geologist.

(3) Willroy Mines Ltd., Willecho Mines Ltd.

The Willroy and Willecho mines are located in the Manitouwadge district and produce copper-lead-zinc and silver. An underground visit was made to both mines and representative rock and ore samples were collected.

At the Willecho mine a 7-ton capacity scoop tram operates on a road bed of crushed rock in 9-foot by 16-foot drifts and inclines and is used extensively for muck disposal.

Ore from the mine is extracted by Willroy employees and milled at the Willroy plant.

A visit was made to the 16th level of the Willroy mine where a relatively flat-lying copper-zinc-silver ore zone, recently discovered by exploratory drilling, was intersected by the level drive.

(4) Zenmac Metal Mines Ltd. The mine, a producer of zinc and cadmium, is located 14 miles north of Highway 17 and may be reached by a gravel road leaving the highway at a point approximately 8 miles west of Schreiber, Ontario. The mill and concentrator are located at Selim Siding.

Two sphalerite ore zones occurring in relatively unaltered gabbroic to dioritic rock are mined from three levels extending from a 400-foot deep shaft.

The ore zones consist of individual, massive sphalerite lenses of varying size extending in a northeasterly direction for a known length of 650 feet, having a maximum width of approximately 200 feet and a northerly dip of 40° to 45°.

Many of the lenses begin as narrow stringers, increasing in width and steepening up dip, suddenly to be truncated at their upper extremity. Widths of individual lenses vary from a few inches to 15 feet to 20 feet.

The ore zones contain massive, frequently coarse grained dark brown sphalerite. Chalcopyrite and pyrrhotite, occurring in only small quantities in massive sphalerite, are commonly found near the hanging wall and at the extremities of the lenses.

A selection of sulphide minerals and host rock was collected.

(5) Thunder Bay Amethyst Mines Ltd. The mine is described in Part 4.

(b) Operations Terminated in 1967

(1) North Coldstream Mines Ltd. This former copper-gold-silver producer terminated mining and milling operations on August 3 and August 5, respectively. The geology of the mine is described by Giblin.[1]

An underground visit was made to the mine and a selection of level plans, sections and samples were collected.

(2) Crooked Green Creek Mines Ltd. This is a former copper-gold prospect in Pipher township. A shaft sinking operation was initiated by the company in 1966. The shaft was sunk to a depth of 32 feet and inclined at 45° (A.T. Kirk, District Engineer of Mines, personal communication). Some gold-copper ore was removed and in 1967, a brief exploratory drilling program was undertaken. During late summer of the same year, operations were abandoned.

(c) Development and Exploration

Three properties continued development and exploration activities during the year.

Great Lakes Nickel Corporation Ltd. and the adjoining Thunder Bay Nickel Mines Ltd. continued exploratory drilling to delineate ore tonnage on their Pardee township property.

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[1] Giblin, P.E., Burchell Lake Area; Ontario Dept. Mines, Geol. Rept. 19, 1964, p. 27-34.

Feasibility studies have been in progress for several years and appear to be encouraging.

Both properties are underlain by a discordant trough-like body of anorthositic olivine gabbro plunging easterly at 15° to 20°.

Copper-nickel-platinum mineralization occurs in several layers near the base of the trough which attains a width of approximately 1000 feet and a length of several thousand feet.

Great Lakes Nickel Corp. Ltd., based on diamond drilling to late 1966, has estimated ore reserves averaging 0.40% copper, 0.20% nickel with $2.00 per ton in precious metals (platinum and palladium)(Canadian Mines Handbook, 1967-1968).

The International Nickel Company of Canada Ltd. Shebandowan project continued exploratory diamond drilling and drifting on their copper-nickel-platinum property in Hagey township. Chalcopyrite-pyrrhotite-pentlandite mineralization occurs in massive, vein and disseminated form in a host rock of sheared peridotite.

A shaft has been sunk to a depth of 1124 feet and five underground levels developed.

The company has staked approximately 250 claims (see District Map, area B) with the probable intent of covering possible easterly extensions of the ore zone.

(d) Re-Evaluation of Properties

(1) Great Lakes Silver Mines Ltd. This former silver property, known as the Rabbit Mountain mine, is located in Scoble township, District of Thunder Bay. During its short life in the 1880's, the mine produced $50,000 worth of silver. The geology of the mine is described by Tanton.[1]

Since its closure, the mine has received sporadic attention. Increases in the price of silver metal have spurred the re-examination of former silver producers in the district. Great Lakes Silver Mines Ltd. began a rehabilitation program of shaft dewatering and partial restoration of underground workings. A systematic sampling program is underway and exploratory diamond drilling has begun.

The mine shaft follows a major northeast-trending vein system varying from a few feet to 6-8 feet in width and dipping 65°N. Levels are developed at 75, 125, 165, and 220 feet and approximately 1300 feet of drifting is evident. At the time of the author's visit, the water level was 30 feet below the floor of the 4th level.

All levels will be sampled and the current drilling will test a secondary parallel vein north of the major vein.

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[1] Tanton, T.L., Fort William and Port Arthur, and Thunder Cape Map Areas, Thunder Bay District, Ontario; Geol. Surv. Canada, Memoir 167, 1931, p.135.

An evaluation, subsequent to the completion of four diamond drill holes and sampling, will determine if a second-stage program is to be initiated.

(2) Other Operations. Creswel Mines Ltd. has concluded a program of underground rehabilitation, mapping and sampling of four former silver properties located in Gillies and O'Connor townships. The program was initiated in early 1966 and future work is pending, awaiting results of the evaluation.

Some exploratory surface diamond drilling has been conducted on another old silver producer, the Beaver mine, located in the southeast corner of O'Connor township.

(e) Staking Activity

The Port Arthur Mining Division experienced a reduction in the number of claims recorded. During the year 3,586 claims were recorded, a drop of approximately 2,000 from 1966 figures.

Staking was concentrated in the Kabamichigama Lake area where 150 claims were staked in late summer; and in the Shebandowan area where the Canadian Nickel Company staked about 250 claims. In the Seeley Lake area north of Marathon, Ontario, Lakehead Mines Ltd. staked 112 claims. These areas are indicated in the resident geologist's district map included in this report.

The information concerning staking was kindly supplied by Mr. J.C. Smith, Mining Recorder of the Port Arthur Mining Division.

While staking activity was relatively quiescent, exploration proved to be more vigorous. Several areas received intensive exploration attention. The Pigeon River area, now well known for copper-nickel occurrences, produced the greater portion of submitted assessment data, reflecting exploration activity in that district.

2. Fort Frances Mining Division (East of Longitude 93°15')

(a) Producing Mines

(1) Steep Rock Iron Mines Ltd. The mine is located in Freeborn and Schwenger townships 3½ miles north of Atikokan.

Hematite-goethite ore is mined from open pit operations and shipped to loading facilities at Port Arthur. A pelletizing plant was operative in October 1967.[1]

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[1] Through the Billion Dollar Barrier, 1967 Review of the Ontario Department of Mines, 1968.

Underground production from the various operations were discontinued in the year.[1]

(2) Caland Ore Company Ltd. The company is a subsidiary of Inland Steel Co. Ltd. and is located in Freeborn township. Hematite-goethite ore of the Steep Rock iron range is mined from open pits and shipped by train to Port Arthur. A pelletizing plant is producing approximately 3000 tons of pellets daily.[2]

(b) Past-Producing Mines

A former gold producer, Sapawe Gold Mines Ltd., located in McCaul township, 12 miles east of Atikokan, terminated operations in late 1966 and is currently inactive.

(c) Staking Activity

Staking activity in this division has been relatively quiet during the year. Approximately 500 claims were recorded, the greater portion staked in the Sapawe, Finlayson Lake and Reed Lake areas. Much of the exploration activity was concentrated along a belt of greenstone and associated mafic intrusions extending from the west boundary of the District of Thunder Bay to Fort Frances.[1]

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[1] Op cit.

[2] Op cit.

The townships of Halkirk and Watten hold many copper-nickel occurrences associated with mafic intrusions. The Noranda Exploration Company Ltd. currently owns a copper-nickel property which is relatively idle at the moment.

3. Patricia Mining Division (Kowkash Section)

(a) Re-Evaluation of Properties

(1) Tashota-Nipigon Mines Ltd. The property is a former gold producer, and the present company was formed to test and evaluate chalcopyrite and gold mineralization. The mine is located one mile west of Onaman Lake, approximately 35 miles northeast of Beardmore, Ontario.

Subsequent to dewatering the shaft, the underground levels were rehabilitated. A program of underground diamond drilling to test possible economic copper mineralization at depth, underground sampling and mapping, and surface mapping and geophysics were completed.

At the time of the author's visit the project was finished and underground equipment subsequently removed.

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[1] Personnal communication, H. Bell, Mining Recorder, Fort Frances Mining Division.

Operations began in May and terminated in October. Future plans have not been announced.

A collection of samples, underground level plans and sections, surface geology and a magnetometer map were obtained.

(b) Staking Activity

Two areas received major staking activity during the year. A base metal discovery near Melchett Lake precipitated a staking rush late in the year. A total of 392 (to December 18, 1967) claims were recorded, with Chimo Gold Mines Ltd. and Lake Osu Mines Ltd. owning the largest blocks.

A new company Nakina Mines Ltd., has been formed and geophysical surveys are currently in progress in preparation for drilling. The Northern Miner reports that an initial grab sample of the mineralization returned 0.30 ounces gold, 0.92 ounces silver, 0.23% copper and 14.85% zinc.[1]

Fifty miles to the west of the Melchett Lake discovery, Canadian Dyno Mines Ltd. holds approximately 325 claims on which geophysical work is in progress in preparation for drilling.[2]

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[1] Northern Miner, September 28, 1967, p.3.

[2] Northern Miner, January 11, 1968, p.19.

Phelps Dodge Corporation of Canada Ltd. holds approximately 100 non-contiguous claims in Oboshkegan township and the Coughlan Lake area. The company is currently testing geophysical anomalies.

Much of the information concerning staking in the Kowkash section was kindly supplied by Mr. K.R. Clemiss, Mining Recorder at Sioux Lookout, Ontario.

Part 4: Property Examinations

Thunder Bay Amethyst Mines Ltd.

Location and Access: The Thunder Bay Amethyst Mine is located in the northeast quarter of Section 4, Concession 6 of McTavish township, approximately 35 miles northeast of the Canadian Lakehead. A gravel road leads to the mine site, 4½ miles from the intersection of East Loon Road and Highway 17.

The workings are situated at the east end of a body of water locally designated Elbow Lake.

General Geology: The main deposit consists of an interconnecting, closely to widely spaced system of amethystine quartz veins within a host of massive, medium-grained, red to pink Archean granite, locally pegmatitic (orthoclase-quartz-muscovite pegmatite) and locally epidotized.

Stripping has exposed the deposit for a length of at least 400 feet and a maximum width of at least one hundred feet. Approximately one-half mile west of the main zone, on a point on the south shore of Elbow Lake and continuing into the lake, is exposed a vein system of amethystine quartz of unknown width, believed to be the continuation of veins occurring at the east end of the lake. One-half mile southeast of Elbow Lake a narrow vein system of amethystine quartz, trending N10°E has been traced intermittently for a strike length of approximately 400 feet.

Structure: The major vein system occupies a fault zone that varies in trend from east-west to N70°W and dips 70°S to vertical. Numerous minor fractures, also amethyst-bearing, intersect the fault zone at N20°W. Many angular granite fragments, varying in width from 0.5 inches to 1.5 feet, are enclosed by vein material and show little evidence of rotation.

Description of Mineralization: Individual amethyst veins vary in width from ¼ inch to 4 feet and include numerous cavities lined with purple crystals. The cavities attain lateral vertical lengths of 10 feet and widths of 4 feet. Well formed pyramidal crystals (points) line the cavities and vary in size from ¼ inch diameter to giants that measure 9 inches from tip to root and 6 inches diameter.

Colouration of crystals and the more massive material is dark purple. Variations in intensity of purple colour occur and locally, colourless and smoky-coloured material is found. Post-amethyst pyrite dusts the surface of amethyst crystals locally.

Mining Operations: Mining operations began several years ago.

Subsequent to blasting a 10 to 12-foot bench, crystal material is hand-cobbed, washed and sold as crystal clusters. A front-end loader removes the remaining material to a stockpile from which rough amethyst stone is extracted, some of which is packed in 45-gallon steel drums and exported. Separation of wholly granitic rock and amethyst material is made.

During 1967, approximately 250 tons of rough and crystal amethyst, including a small amount of granite material, were mined and sold.

The operation is seasonal and mining is suspended during the winter months.

Markets and Uses: Much of the amethystine and granite rock are used locally by the construction industry. Exports have been made to various parts of Canada, United States, Japan and Finland.

The bulk of the quarried rock is used by the construction industry for exterior wall facings; some material has been employed as landscaping stone. Mineral collectors and lapidarists purchase a good portion of crystalline material which in addition to being exported, is also sold at the mine site.

Granite rock from the mine appears to be suitable as gabion and building stone.

Test panels consisting of tumbled amethyst embedded in a white adhesive are being considered for wall-panelling.

D. Thorsteinson

Location: The property is located on the north side of Kabamichigama Lake, approximately 32 miles northeast of Nipigon, Ontario. A private road passes through the property.

General Geology and Structure: The Kabamichigama Lake area is underlain by massive to gneissic Archean granite, transected by northeast-southwest and northwest-southeast trending linears, some known to be faults.

In recent years copper mineralization has been detected along some of the linears.

The Thorsteinson showing occurs along a northwest-southeast trending fracture zone at least 120 feet wide. Mineralization was uncovered during road construction.

The fault zone occurs in a medium-grained, biotitic and epidotized, white to pink, massive to gneissic granite. Locally, small, partly assimilated xenoliths of basic material are enclosed by the granite. The fault is impregnated with a mass of quartz veins of varying width, cementing fractured rhyolite breccia and andesite occurring along the west and east sides of the fault. The mid-portion of the fault, at the time of the author's visit, was drift and snow covered and not trenched.

The major fault zone trends N50-55°W. Minor, two-inch quartz-filled fractures trend N15°E and show small scale displacements.

Five of the six trenches that expose the mineralization at the edges of the fault show mineralized volcanic fragments, highly fractured and cemented by quartz. As zones of intense quartz veining are approached, the volcanic fragments appear to be more finely comminuted.

Mineralization: Quartz is the major gangue mineral associated with chalcopyrite, pyrite, a little chalcocite and malachite. The better mineralization appears to be more closely associated with volcanic fragments rather than with the quartz, which is commonly pyrite-bearing. Chalcopyrite occurs as irregular splashes in the volcanic rock, less commonly in the quartz. Locally, the sulphide constitutes 10% of the rock. Pyrite, as discrete grains, is common to both volcanic and quartz portions.

Three grab samples of the mineralized rock were collected by the author and submitted to the Laboratory Branch of the

Ontario Department of Mines for assay. Copper values of 0.40%, 0.47% and 0.89% were returned. Assays in excess of 1% copper have been reported from the property.

H. Milkie

Location: The property is located in the central part of Haines township, 60 miles west of The Canadian Lakehead.

General Geology: The property is underlain by a differentiated and foliated basic intrusive associated with sheared basic volcanic flows.[1]

Mineralization: Within the mafic intrusive mass occur lenslike segregations of magnetite-carrying pods, veins, and streaks of crystal accumulations of chalcopyrite, pyrite and pyrrhotite. The mineralization is associated with narrow, intense shear zones extending intermittently in an easterly direction across the property.

In the southwest part of the claim group the sulphides occur in a chloritic schist as seams and patches, locally constituting better than 50% of the rock.

The property has been tested by diamond drilling, geochemistry and geophysics, and trenching.

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[1] Hodgkinson, J.M., Shebandowan Lake (West) Area; Ontario Dept. Mines, Preliminary Map P.223, 1964.

Several chip samples of the mineralized portions were submitted to the Laboratory Branch of the Ontario Department of Mines. One analysis of chips taken across 213 feet gave copper, 1.49%; nickel, 0.20%; platinum, trace.

C. Downey

Location: One claim, covering a feldspar showing in the northwest corner of Pic township, is situated 4 miles northeast of the town of Marathon, Ontario.

General Geology: The area is underlain by an augite syenite, or laurvikite. In decades past, the rock was mined for use as building stone.

Mr. Downey's showing is exposed along an east-facing, north-trending cliff 20 to 25 feet high. Two pits, approximately 60 feet apart, have been dug 8 to 10 feet into the cliff and for the entire height of the face.

Feldspar mineralization occupies a gently northwest-dipping tabular zone approximately 20 feet thick and at least 350 feet long. The zone consists of two pegmatitic mafic (augite) poor phases at the upper and lower edges, and a narrower, finer grained mafic (augite) central portion. The pegmatitic portions pass gradationally into laurvikite within a zone 6 to 12 inches wide.

Closely spaced, northeast-trending vertical fractures transect the rock at the cliff face, and minor flat-dipping fractures, parallel to the tabular zone, are evident.

The medium-grained laurvikite is coloured brownish-black to dark green on the fresh surface and weathers dark rusty brown.

Weathering effects penetrate deeply, aided by fracture channels, and spheroidal weathering is common.

Mineralization: Feldspar minerals of the pegmatite zone are patch and string perthites rich in potassium. Subhedral crystals vary in widest dimension from ½ to 6 inches and are coloured light green on the non-opalescent surface.

A pleasing display of opalescence in merging colour patches of purple, deep and lighter blue, gold and yellow is exhibited. Rarely, crystals display uniform, repeated colour bands 1/16 to ¼ inch wide.

Feldspar stain tests indicate a high proportion of potassium. X-ray diffraction patterns of the opalescent material are currently under investigation.

Colourless and smoky quartz crystals occur in fractures as well as seams of black aenigmatite, a titano-silicate of iron and sodium.[1]

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[1] Aenigmatite identified by Department of Mines and Technical Surveys, Ottawa, Ontario.

Banded red carnelian and titaniferous magnetite occupy crystal interstices.

Some radioactivity has been detected as the cliff face.

The deposit has caught the interest of lapidarists, and much material has been cut and polished. The polished stone, despite numerous fractures, displays pleasant opalescence, and it is hoped that, as more rock is removed, material relatively free of fractures and iron stains will be exposed.

D. Simon

Location: The property is located on Farley Island, situated in O'Sullivan Lake, 50 miles north of Geraldton, Ontario.

General Geology and Structure: The O'Sullivan Lake area, noted for silver and gold occurrences, was mapped by Moorhouse for the Ontario Department of Mines.

The rocks of Farley Island consist of northeast-trending, sheared, interbanded, intermediate volcanics and tuffs.

At the west end of the island, a system of several gently sinuous gash fractures, up to 12 inches wide and trending perpendicular to rock foliation, are filled with massive, milky quartz. Near the edges of the veins the host rock has been silicified.

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[1] Moorhouse, W.W., Geology of the O'Sullivan Lake Area; Ontario Dept. Mines, Vol.64, pt.2, 1955.

Mineralization: The major gangue mineral is milky quartz. It is associated with calcite and lesser amounts of pyrite, arsenopyrite, galena, sphalerite and gold and silver values, of which silver appears the most important.

Rather commonly the visible metallic minerals are concentrated at quartz vein borders and frequently spread into the enclosing host material. Pyrite and arsenopyrite frequently occur as streaks and extended clots of grains at silicified vein contacts. Galena and sphalerite mineralization is minor and occurs as streaks and discrete grains within the quartz, near vein contacts.

Several select samples taken by the owner of quartz, heavily mineralized with arsenopyrite and pyrite in addition to galena and sphalerite were submitted by the author to the Laboratory Branch, Ontario Department of Mines and gave on analysis very high silver values.

J. Strickland

Location: The claim group is located in lot 5, concession 7, Crooks township, 25 miles southwest of the Canadian Lakehead.

General Geology and Mineralization: The Pigeon River area is underlain by gently southeast-dipping sediments of the Rove Formation intruded by dikes of diabase and gabbro and sills of diabase, gabbro and anorthositic gabbro. The latter rock hosts economic quantities of copper-nickel mineralization.

The Strickland claims cover two local occurrences of sulphide mineralization which have been opened by trenching. The first occurs in a northeast-trending dike system in which massive copper-nickel sulphides are confined to narrow, vertical fractures and lenslike masses on the south side of a topographically prominant diabase-gabbro dike. Nickeliferous pyrrhotite, chalcopyrite and pyrite occur primarily as fracture fillings, and less noticeably as grains disseminated through the rock.

The second occurrence outcrops on the south side of the Pine River, one-half mile south of the first. Here, medium-grained, massive grey gabbro, not unlike material underlying the Great Lakes Nickel Company property, holds interstitial chalcopyrite and nickeliferous pyrrhotite mineralization. This occurrence has been tested by diamond drilling and further exploration is planned.

C. Hacl - A. Bahleida

Location: This claim group, covering mineralization occurring in a diabase-gabbro dike, is located in lot 5, concession 7, Crooks township.

General Geology: The geological environment is similar to that occurring on the Strickland claims 2 miles southwest. Massive sulphide mineralization occurs along the south crest of a dike approximately 300 feet high and 150 to 200 feet wide.

Copper-nickel sulphides (chalcopyrite and pentlandite) associated with pyrrhotite and pyrite, fill vertical and horizontal fractures 1 to 6 inches wide, and occupy lenslike pods in medium-grained, massive grey diabasic to gabbroic rock.

In order of abundance, the sulphide minerals are nickeliferous pyrrhotite, chalcopyrite and pyrite. Frequently, chalcopyrite rims pyrrhotite grains, and replacement of the host by sulphides is particularly evident at vein contacts. Disseminated sulphides, occurring in the host rock in abundance in the vicinity of veins, are relatively rare in areas removed from sulphide-rich portions.

O. Albert

Location: This group of 24 claims located approximately 9 miles south of Longlac, Ontario and owned by O. Albert of Longlac, covers a copper prospect.

General Geology and Structure: Much of the rock underlying the claim group is pinkish to white, foliated Archean granite, enclosing easterly-trending, steeply dipping lenses of sheared dacitic to andesitic material, impregnated with quartz veins and mineralized with pyrite and lesser amounts of chalcopyrite. The sulphide minerals occur as narrow smears, seams and less noticeably as disseminations in the sheared volcanic material and quartz.

The occurrence has been opened by a single trench, 4 feet wide and 7 feet long.

A selected grab sample of mineralized material taken by the author was assayed by the Laboratory Branch, Ontario Department of Mines and found to contain 0.28% copper and a trace of gold. Other material submitted by Mr. Albert returned 1.28% copper.

J. Untersander

Location: The property is located in the southwest quarter of O'Connor township, approximately 20 miles west of the Canadian Lakehead.

General Geology and Structure: Transecting a relatively flat-lying taconite and shaly member of the Gunflint Iron Formation, a northeast-trending, vertically dipping fault zone has been traced intermittently for at least one mile. The zone is filled with quartz, calcite and barite and varies in width from a few feet to at least 20 feet. Near the walls of the vein, and enclosed by vein matter, are found angular fragments of shaly and taconitic material, finely comminuted to several inches in widest dimension.

The vein has been tested by several vertical pits, one which reaches a depth of 10 feet.

Mineralization: Calcite and white to amethystine quartz constitute much of the vein matter. Lesser amounts of pinkish barite and a little green fluorite, sphalerite, galena and pyrite occur. An occasional speck of chalcopyrite is observed and small vugs, lined with pale coloured amethystine quartz, are common.

Several samples submitted to the Laboratory Branch of the Ontario Department of Mines assayed trace amounts of silver. One assay certificate received by the owner indicated a barite purity of approximately 80%.

Part 5: Research Activity

1. Theses

Mr. J.M. Franklin, graduate student at the University of Western Ontario, is undertaking a metallogenic study of the Proterozoic rocks in the District of Thunder Bay. All mineral deposits associated with the Proterozoic rocks will be studied and an attempt will be made to group the deposits into distinct classes, based on such parameters as mineralogical and structural similarity and wall rock alteration. It is hoped that a reasonable origin for copper, nickel, silver, lead, zinc, and uranium deposits will be indicated.

Mr. K. Fenwick is currently examining the syngenetic or epigenetic origin of a sulphide deposit in the Finlayson Lake area. His graduate research is being conducted at the Michigan Technological Institute.

Dr. V.G. Milne, Departmental geologist, will begin a study of ore deposits in the Manitouwadge area in 1968.

Part 6: Some Considerations for Future Mineral Exploration

Copper-nickel occurrences in the Pigeon River area have been well known for many years. The association of sulphide mineralization with basic sills and dikes has caused a flurry of prospecting in recent years. Figure 2 shows some of the copper-nickel occurrences associated with sills and dikes in the Pigeon River area. A strong correlation of mineralization with dikes is evident. Sulphides in this

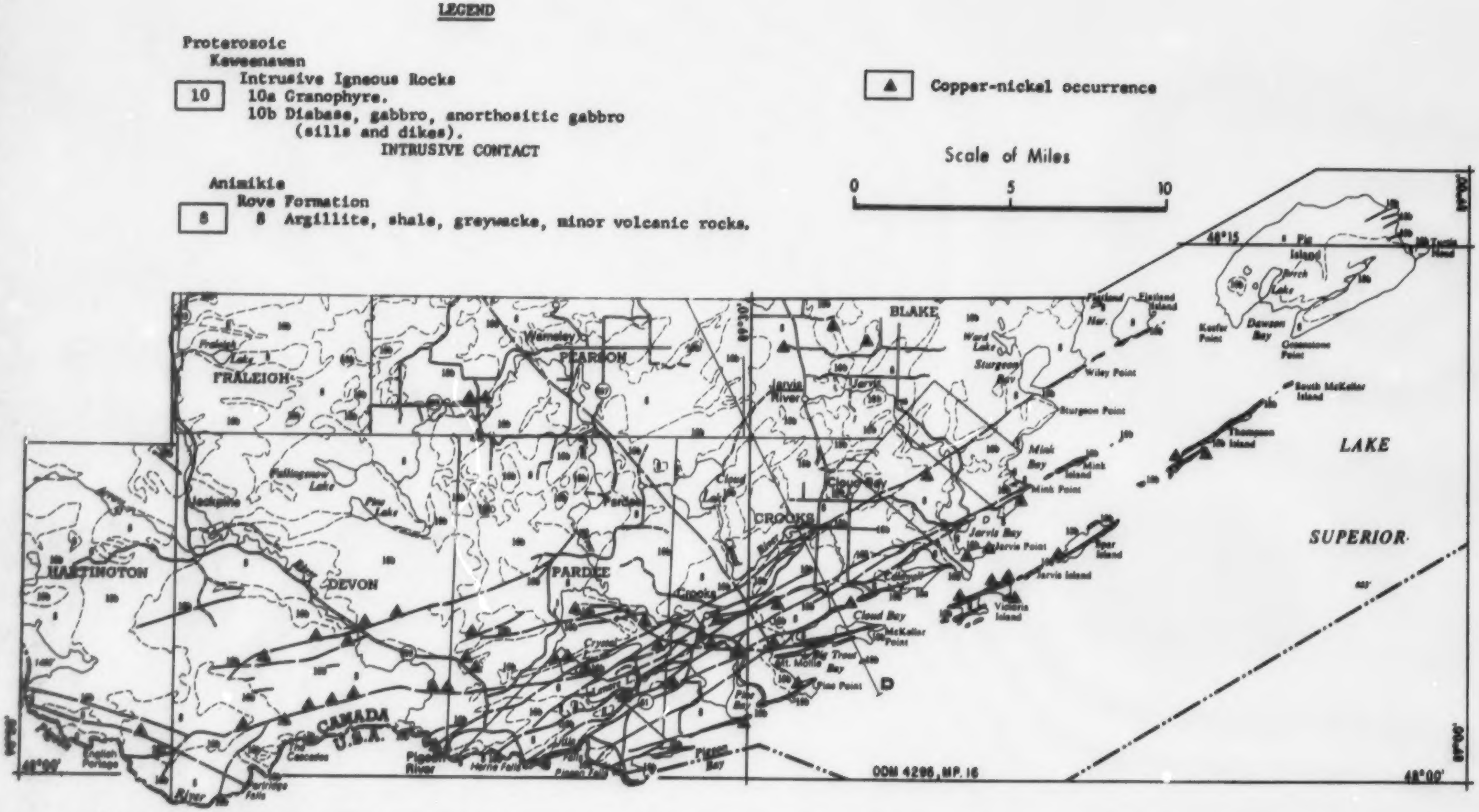
LEGEND
Proterozoic
Keweenawan
Intrusive Igneous Rocks
10
10a Granophyre.
10b Diabase, gabbro, anorthositic gabbro (sills and dikes).
INTRUSIVE CONTACT
Animikie
Rove Formation
8
8 Argillite, shale, greywacke, minor volcanic rocks.
▲ Copper-nickel occurrence
Scale of Miles
0
5
10
48°15'
48°00'
Pie Island
Birch Lake
Dawson Bay
Keefer Point
Greenstone Point
Turtle Head
South McKellar Island
Thompson Island
LAKE
SUPERIOR
Flatland Island
Flatland Har.
Wiley Point
Sturgeon Point
Sturgeon Bay
Ward Lake
Mink Bay
Mink Island
Mink Point
Jarvis Bay
Jarvis Point
Jarvis Island
Spar Island
Victoria Island
Cloud Bay
McKellar Point
Pine Point
Pine Bay
Mt. Mollie Bay
Pigeon Bay
BLAKE
PEARSON
Wamsley
FRALEIGH
Fraleigh Lake
Jarvis River
CROOKS
Crooks
Cloud Lake
Cloud Bay
PARDEE
Pardee
DEVON
Pine Lake
Fallingsnow Lake
Jackpine
HARTINGTON
Crystal
CANADA
U.S.A.
Pigeon River
Pigeon Falls
Horne Falls
The Cascades
Partridge Falls
English Portage
River
D
ODM 4296, MP. 16

Figure 2. Copper and nickel occurrences associated with dikes and sills in the Pigeon River area, District of Thunder Bay

environment are structurally controlled and localized in fractures along the edges of the dikes. Many other occurrences may exist and these dikes merit investigation.

Prior to the 1900's, the Lakehead area was noted for its rich silver occurrences. An examination of Map 2065, a geological compilation map of the Lakehead-Atikokan area, indicates numerous silver properties and occurrences falling within a northeasterly trending belt, 5 to 7 miles wide and in excess of 60 miles in length. Many of the occurrences are shown associated with calcite-filled fractures extending intermittently from the Silver Mountain area through the Rabbit Mountain area to the Canadian Lakehead. Much of the region between these occurrences is drift-covered and it is not unreasonable to assume that similar calcite-filled fractures are overlain by drift. Possible silver mineralization under the drift areas may be detected by some geochemical technique. Oja has described the results of geochemical investigations of a local portion of the belt.[1]

Various greenstone belts with associated mafic to ultramafic intrusions exist in the area. The common association of economic mineralization, particularly base metals, with these belts encourages intensive prospecting.

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[1] Oja, R.V., Geochemical Investigations of the Thunder Bay Silver Area; in Proceedings, Symposium on Geochemical Prospecting, April 1966, p. 211-221.

One example is the recent base metal discovery at Melchett Lake, 40 miles north of Nakina, Ontario. This discovery is "brand new" and was made in an area which, in the past, has received much prospecting activity.

In addition to favourable structural controls to localize ore deposits, one should closely examine felsic and mafic volcanic contacts for sulphide mineralization. Pyroclastic rocks, due to their porous nature, may serve to localize sulphides.

In the Kabamichigama Lake area, 35 miles northeast of Nipigon, Ontario, copper mineralization has been detected along prominant linears transecting granitic rocks. Within these linears, chalcopyrite-bearing volcanic material has been found. This area, particularly the linears, deserves attention by prospectors.

Within the past three years, some attention has been focussed upon the contact zone between Archean granite and the Sibley sediments. Much of the contact region is faulted and this has served to localize copper and lead-zinc mineralization. At least one copper occurrence in this environment was recently drilled. A greater portion of the contact is covered with drift and further prospecting is warranted.

Native copper mineralization occurs on the Black Bay Peninsula, and on St. Ignace Island in Nipigon Bay. Noranda Explorations Ltd. examined native copper-chalcocite mineralization in a sandstone member of the Osler series outcropping along the west side of the Black Bay Peninsula. The peninsula and the offshore islands have lacked intensive prospecting and perhaps this area deserves further attention.

The recent surge in uranium exploration concomitant with a rising demand for the element, has precipitated numerous staking rushes throughout Ontario. Specifically, uranium occurrences in the Gullwing Lake area, 30 miles northeast of Dryden, Ontario have received some attention. Several uranium showings are found in the District of Thunder Bay and some of these are being re-examined. Radioactivity has been detected in the Sibley sediments.

Numerous lithium-pegmatite occurrences exist in the district, the most important occurring in the Barbara Lake-Georgia Lake area. The use of lithium in battery-powered automobiles indicates an encouraging outlook for Canadian lithium occurrences. The lithium-bearing pegmatites in the Georgia Lake area may experience renewed activity.

Acknowledgments

The assistance of Messrs. H. Bell, K. Clemiss and J.C. Smith, Departmental Mining Recorders at Fort Frances, Sioux Lookout and Port Arthur, is gratefully acknowledged.

The kind cooperation of various mine officials who kindly provided information is much appreciated.

The members of the local mining fraternity with whom the writer had many verbal communications during the year were most helpful, and the opportunity to meet and chat with these people is appreciated.

INDEX TO LOCATION OF AREAS IN WHICH ASSESSMENT DATA FILED DURING 1967*

Port Arthur Mining Division

1. Black Sturgeon
2. Block Creek
3. Duck Lakes-Schreiber
4. Heron Bay-White Lake
5. Hogarth-Upsala
6. Jackfish-Middleton
7. Kakabeka
8. Kaministikwia
9. Lac Des Mille Lacs
10. Little Long Lac-Sturgeon River
11. Longlac-Pagwachuan
12. Loon Lake
13. Manitouwadge
14. Onaman South
15. Pigeon River
16. Shebandowan Lakes

Fort Frances Mining Division
(East of Longitude 93°15')

17. Atikokan
18. Mine Centre
19. Rainy Lake

Patricia Mining Division
(Kowkash Section)

20. Caribou Lake
21. Gzowski-Kowkash
22. Onaman North
23. Shabuskwia Lake
24. Zig-Zag Lake
25. Melchett Lake, Percy Lake and Muriel River

⑥* Numbers enclosed by a black circle are located in the upper left-hand corner of each geographic block.

● PRODUCING MINES

1.	Caland Ore Company Ltd.	Iron
2.	Steep Rock Iron Mines Ltd.	Iron
3.	Thunder Bay Amethyst Mines Ltd. (Seasonal operation)	Amethyst, Stone
4.	MacLeod-Mosher Gold Mines Ltd.	Gold
5.	Zenmac Metal Mines Ltd.	Zinc, Cadmium
6.	Noranda Mines Ltd. (Geco Division)	Copper, Gold, Zinc
7.	Willroy Mines Ltd.	Copper,Zinc,Lead,Silver
8.	Willecho Mines Ltd.	Copper,Zinc,Lead,Silver

○ PAST-PRODUCING MINES, OPERATIONS TERMINATED 1967

1.	North Coldstream Mines Ltd.	Copper, Gold, Silver
2.	Crooked Green Creek Mines Ltd.	Copper, Gold

◐ PROPERTIES ENGAGED IN EXPLORATION AND DEVELOPMENT

1.	Great Lakes Nickel Corp. Ltd.	Copper,Nickel,Platinum
1.	Thunder Bay Nickel Mining Corp.	Copper,Nickel,Platinum
2.	International Nickel Company of Canada, Ltd., The (Shebandowan Mine)	Copper, Nickel Platinum, Cobalt

▲ MINES REHABILITATED DURING 1967

1.	Tashota-Nipigon Mines Ltd.	Gold, Copper
2.	Great Lakes Silver Mines Ltd. (Rabbit Mountain Mine)	Silver

▲ RE-EVALUATION OF OTHER PROPERTIES

3.	Creswel Mines Ltd. (Porcupine, Climax, Silver and West Beaver Mines	Silver
4.	Beaver Mine	Silver

X PROPERTY EXAMINATIONS

1. D. Simon
2. H. Milkie
3. O. Albert
4. C. Downey
5. D. Thorsteinson
6. J. Strickland
7. C. Hacl - A. Bahleida
8. J. Untersander

▨ AREAS OF STAKING ACTIVITY

PORT ARTHUR MINING DIVISION

A. Kabamichigami Lake (D. Thorsteinson)
B. Shebandowan Lake (International Nickel Co. of Canada Ltd.)
C. Seeley Lake (Lakehead Mines Ltd.)

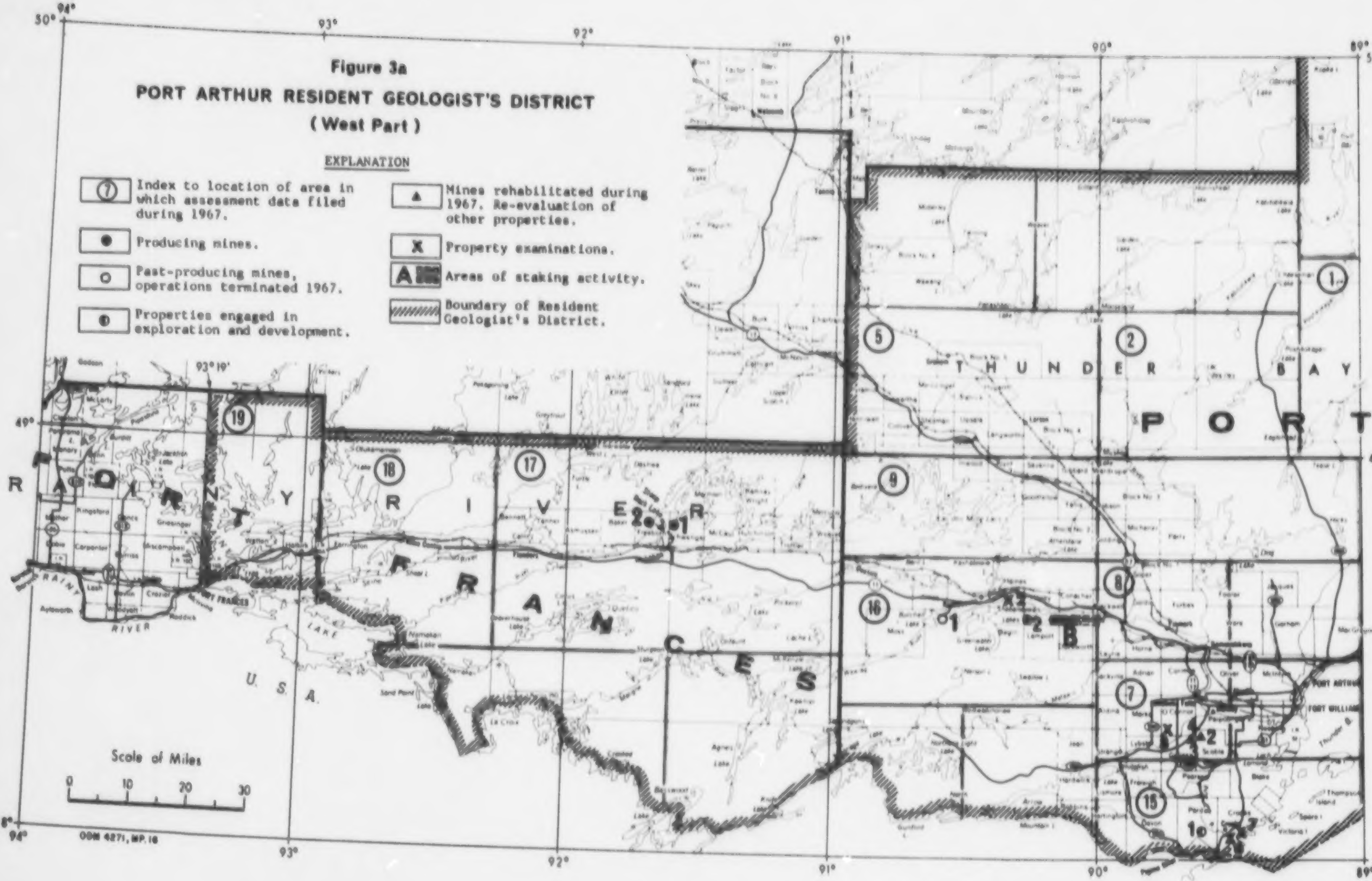
PATRICIA MINING DIVISION (KOWKASH SECTION)

D. Melchett Lake (Nakina Mines Ltd., Chimo Gold Mines Ltd., United States Smelting, Refining and Mining Co.)
E. Crescent Lake (Canadian Dyno Mines Ltd.)
F. Onaman Lake Area (Phelps-Dodge Corporation of Canada Ltd., 1966 Staking)

Figure 3a

PORT ARTHUR RESIDENT GEOLOGIST'S DISTRICT

(West Part)


EXPLANATION
7 Index to location of area in which assessment data filed during 1967.
● Producing mines.
○ Past-producing mines, operations terminated 1967.
◐ Properties engaged in exploration and development.
▲ Mines rehabilitated during 1967. Re-evaluation of other properties.
X Property examinations.
A Areas of staking activity.
Boundary of Resident Geologist's District.
THUNDER BAY
PORT
RAINY RIVER
FORT FRANCES
RAINY LAKE
U. S. A.
PORT ARTHUR
FORT WILLIAM
Scale of Miles
0
10
20
30
94°
93°
92°
91°
90°
89°
93°19'
49°
48°
50°
ODM 4271, MP.18

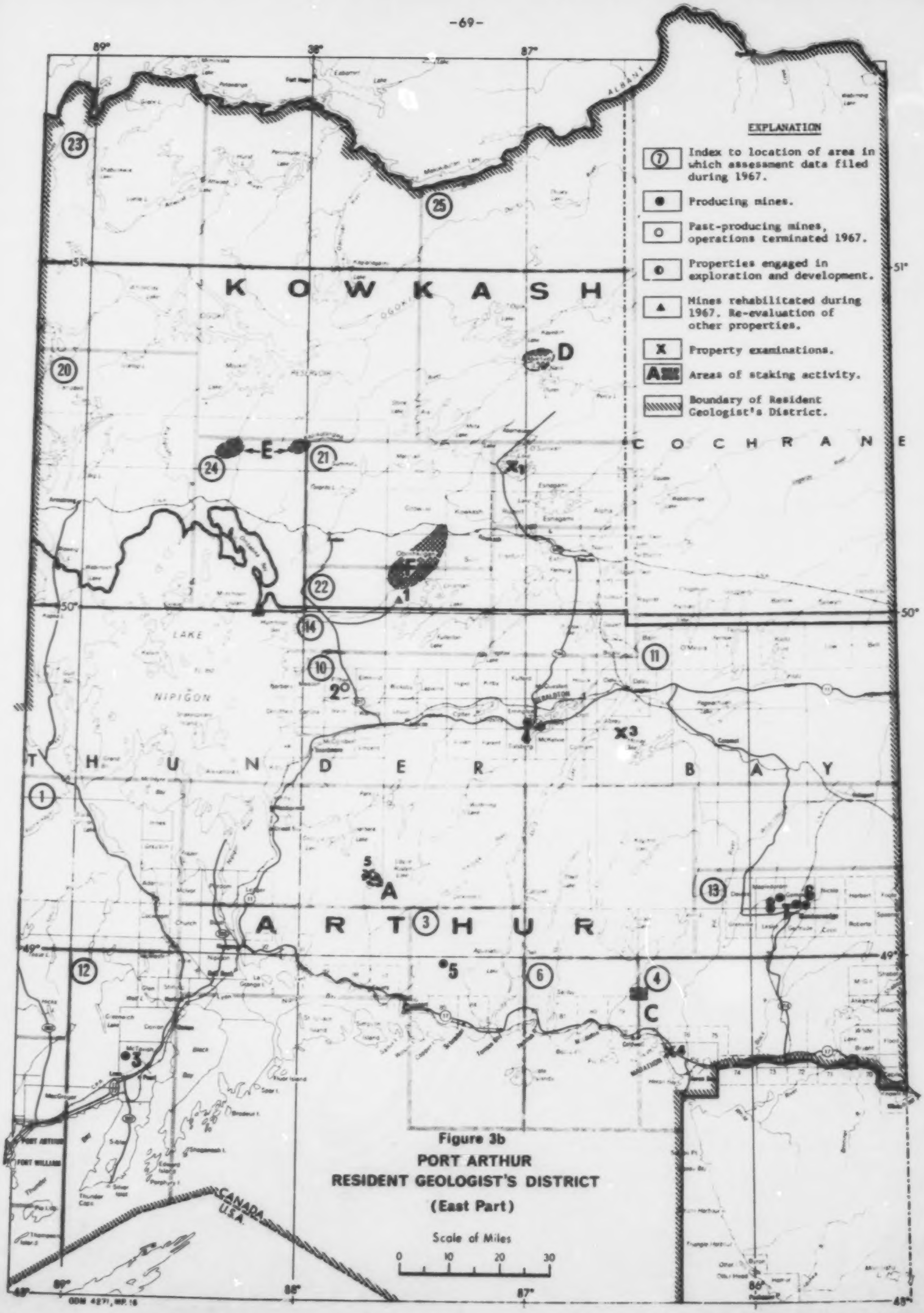

EXPLANATION
⑦ Index to location of area in which assessment data filed during 1967.
● Producing mines.
○ Past-producing mines, operations terminated 1967.
◐ Properties engaged in exploration and development.
▲ Mines rehabilitated during 1967. Re-evaluation of other properties.
X Property examinations.
A Areas of staking activity.
▨ Boundary of Resident Geologist's District.
89°
88°
87°
86°
51°
50°
49°
48°
KOWKASH
COCHRANE
THUNDER BAY
ARTHUR
LAKE NIPIGON
ALBANY
OGOKI
PORT ARTHUR
FORT WILLIAM
MARATHON
CANADA
U.S.A.
A
C
D
E
F
X1
X3
X4
1
2
3
4
5
6
10
11
12
13
14
20
21
22
23
24
25
Scale of Miles
0
10
20
30
ODM 4271, MP. 16

Figure 3b

PORT ARTHUR

RESIDENT GEOLOGIST'S DISTRICT

(East Part)

Volume

2

ONTARIO
DEPARTMENT OF MINES

ANNUAL REPORT
of
RESIDENT GEOLOGISTS' SECTION
GEOLOGICAL BRANCH

1967

Compliments of
ONTARIO
MINISTRY OF NORTHERN DEVELOPMENT
AND MINES
Not for resale

PART 2

Sault Ste. Marie District by P. E. Giblin

Sudbury District by J. [illegible] Donovan

MISCELLANEOUS PAPER 17

FEBRUARY, 1968

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Preface

This annual report for 1967 is the first separate publication covering the work of the Resident Geologists of the Department of Mines for a specific calendar year. In the past the annual "Summary of Field Work by the Geological Branch" had a section devoted to the activities of the Resident Geologists. This is now discontinued. In the future there will be two separate publications, one dealing with the activities of the summer field parties and published late in the calendar year; the other will cover the Resident Geologists' work and be published early in the following year.

This annual report is issued in four parts to cover the Resident Geologists' districts as follows:

Part 1. Kenora and Port Arthur.
Part 2. Sault Ste. Marie and Sudbury.
Part 3. Kirkland Lake, Cobalt, and Timmins.
Part 4. Southern Ontario.

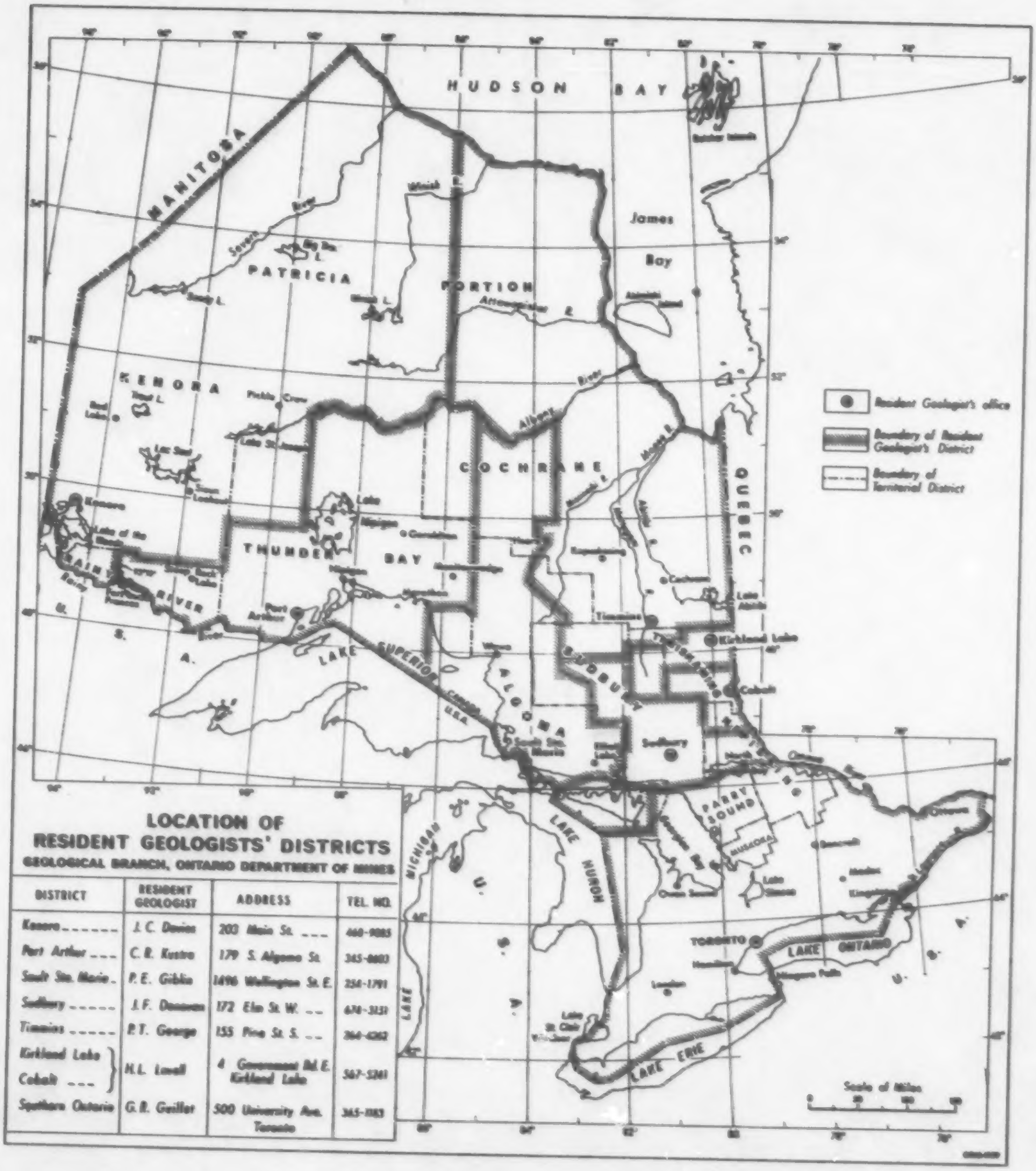
These reports may be issued at separate times and not necessarily in the order listed above. Notices of the releases will be mailed to those on the Department of Mines Notification List.

The Resident Geologists are stationed throughout the province to carry on field work and to gather and disseminate information concerning the geology and mineral resources of their districts. At some localities one or more field geologists of the Geological Surveys Section may be permanently located with the Resident Geologist. In addition to personal observations of the staff, the information collected at the offices includes diamond-drilling records, geological, geophysical, and geochemical maps and reports submitted to the government for assessment work credit, and data on mineral deposits contributed by companies or individuals on a voluntary basis. This information is indexed and kept on open file. Duplicate copies of the assessment work data are also on open file at Room 1323, Mining Lands Branch, Department of Mines, Parliament Buildings, Toronto.

The miscellaneous duties of the Resident Geologists are described in the reports that follow. An index map showing the outline of the resident geologists' districts, and the names, addresses and telephone numbers of the Resident Geologists is shown on the next page.

The objective of this report is to summarize the highlights of the mineral industry in each district during the past year, and also to present any significant new information that may have a bearing on future mineral developments. This could be new discoveries, new geological concepts, new access roads, new maps and literature, the influence of technological advances, new marketing conditions, etc. It is hoped that such data may be useful to those engaged in mineral exploration throughout the province.

J.E. Thomson,
Chief, Resident Geologists' Section


HUDSON BAY
James Bay
MANITOBA
PATRICIA
PORTION
KENORA
COCHRANE
THUNDER BAY
ALGOMA
SUDBURY
TIMISKAMING
QUEBEC
PARRY SOUND
MUSKOKA
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
LAKE ONTARIO
LAKE ERIE
RAINY RIVER
U. S. A.
CANADA
U.S.A.
Kenora
Port Arthur
Sault Ste. Marie
Sudbury
Timmins
Kirkland Lake
Cobalt
Toronto
Ottawa
Kingston
Hamilton
London
Niagara Falls
Cochrane
Owen Sound
Lake Simcoe
Albany River
Attawapiskat R.
Severn River
Lake Nipigon
Lake of the Woods
Resident Geologist's office
Boundary of Resident Geologist's District
Boundary of Territorial District
Scale of Miles
0
50
100
150

LOCATION OF RESIDENT GEOLOGISTS' DISTRICTS

GEOLOGICAL BRANCH, ONTARIO DEPARTMENT OF MINES

DISTRICT	RESIDENT GEOLOGIST	ADDRESS	TEL. NO.
Kenora	J. C. Davies	203 Main St.	468-9085
Port Arthur	C. R. Kustra	179 S. Algoma St.	345-8603
Sault Ste. Marie	P. E. Giblin	1496 Wellington St. E.	254-1791
Sudbury	J. F. Donovan	172 Elm St. W.	674-3131
Timmins	P. T. George	155 Pine St. S.	264-4262
Kirkland Lake Cobalt	H. L. Lovell	4 Government Rd. E. Kirkland Lake	567-5241
Southern Ontario	G. R. Guillet	500 University Ave. Toronto	365-1183

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Township 29, Range 23 54

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Township 29, Range 27 55
Township 30, Range 19 55
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Township 30, Range 25 56
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Township 150 61
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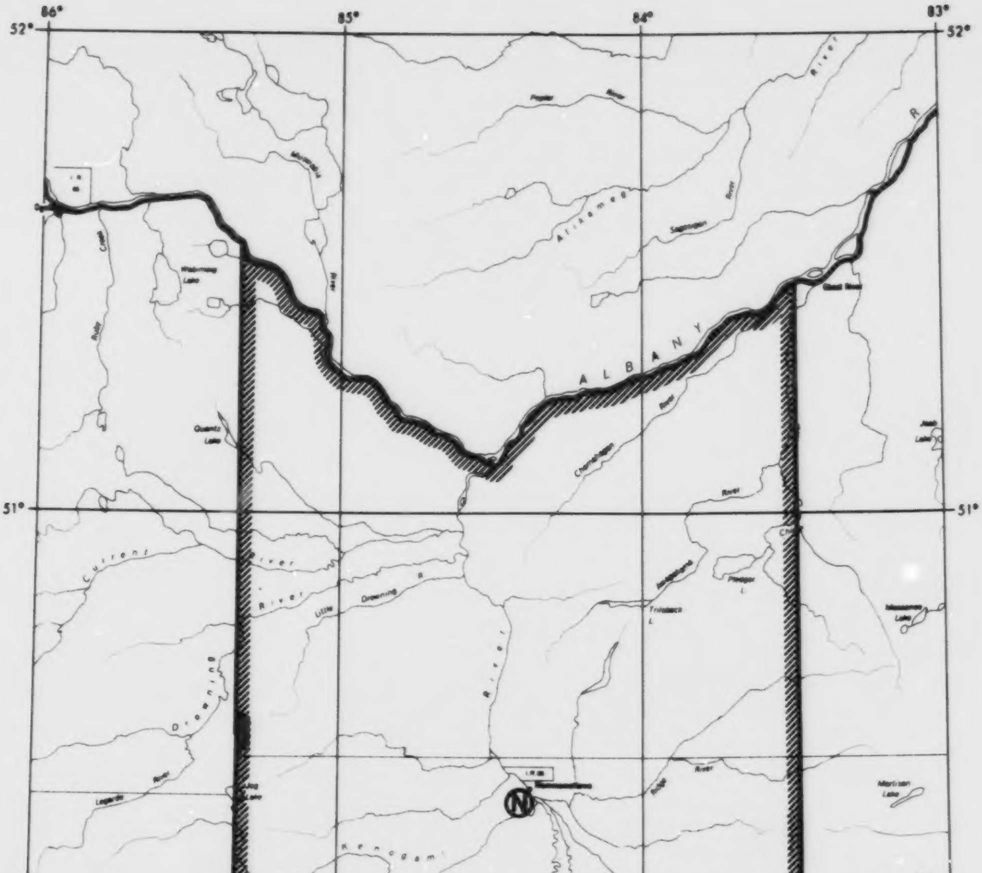
86°
85°
84°
83°
52°
51°
50°
49°
ALBANY
River
Kenogami
Drowning
Current River
Little Drowning R.
Squirrel R.
Nagagami River
Scale of Miles
0
10
20
30
SAULT
Barlow
Selwyn
Henderson
Bicknell
Burrell
Rowlandson
Burstall
Kilaiz
Low
Bell
Boyce
Shetal
Mulloy
Fintry
Auden
Rogers
Fushimi
Bannerman
Ritchie
Mulvey
Goldwin
Scovil
Clavet
Kohler
McCoig
McMillan
Gill
Stoddart
Hanlan
Caegrain
Shannon
Sankey
Devitt
Downer
Mercer
Cross
Arnott
Storey
Nassau
Irish
Kendall
Eilber
Francoa
Hiawatha
Frost
McEwing
Langemarck
Verdun
Landry
Lowther
Shetland
Staunton
Barker
Flanders
Nagagami
Elgie
Newlands
Dowsley
McFarlen
Ebbs
Orkney
Magladery
Shearer
Foch
Lessard
Wicksteed
Haig
Farquhar
Alderson
Talbott
Schofield
Caithness
Robert
Fergus
Chelsea
Larkin
Lascelles
Woolrich
Roche
Bayfield
Beeton
Lipton
Derry
Wells
ODM 4270, MP 17
Adjoins Figure 1b

FIGURE 1a-SAULT STE. MARIE RESIDENT GEOLOGIST'S DISTRICT
(North Part)

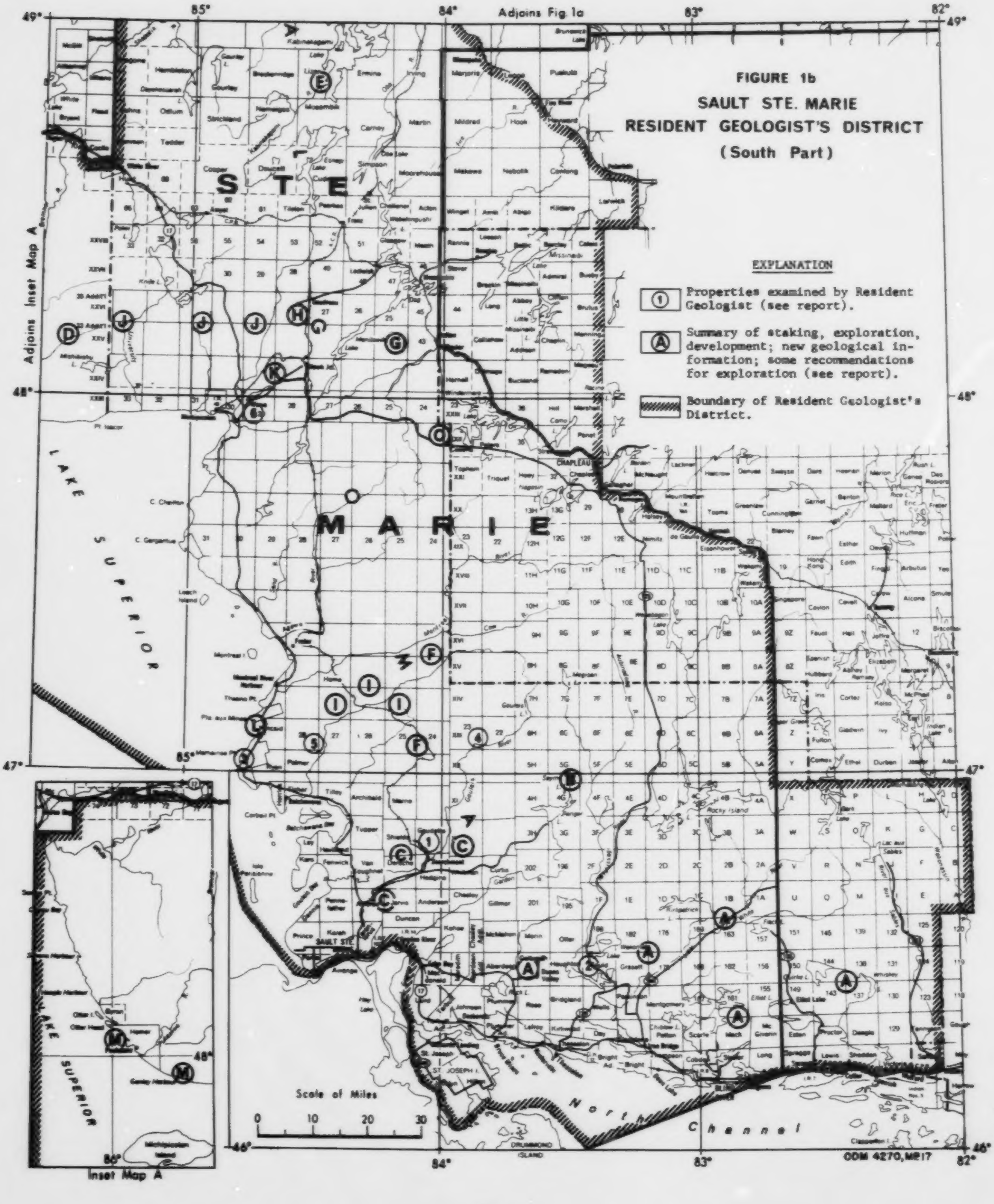
Adjoins Fig. 1a
Adjoins Inset Map A
49°
85°
84°
83°
82°
48°
47°
46°
86°
STE.
MARIE
LAKE SUPERIOR
North Channel
SAULT STE.
CHAPLEAU
ST. JOSEPH I.
DRUMMOND ISLAND
Michipicoten Island
Scale of Miles
0
10
20
30
Inset Map A
ODM 4270, MR17

FIGURE 1b
SAULT STE. MARIE RESIDENT GEOLOGIST'S DISTRICT
(South Part)

EXPLANATION

①	Properties examined by Resident Geologist (see report).
Ⓐ	Summary of staking, exploration, development; new geological information; some recommendations for exploration (see report).
▨	Boundary of Resident Geologist's District.

Sault Ste. Marie District

by P.E. Giblin[1]

Part 1

List of Activities of Resident Geologist and Staff, Sault Ste. Marie Office, 1967

Staff of the Resident Geologist's office in Sault Ste. Marie during 1967 consisted of a secretary; one, and sometimes two, geologists of the Geological Surveys Section; and the Resident Geologist.

The secretary was occupied in filing and cross-indexing of accessions to the assessment work and other files, and in routine secretarial duties.

Geologists of the Geological Surveys Section devoted a portion of their time to assisting in a map compilation project.

For the Resident Geologist, routine office duties consisted of answering inquiries from mining companies and individuals; advising same on the mineral potential and mining history of the district, and projected prospecting and exploration programs; assisting geologists of the Geological Surveys Section in compilation of Mineral Resources Circulars; and identifying minerals and rocks for the public.

Considerable time was devoted to preparation of a series of geological compilation maps, at the scale of 1 inch to 2 miles, which cover the Wawa; Michipicoten Island - Tip Top Mountain; and Franz - Oba - Hornepayne areas. Work on the 3 map sheets is well advanced, and it is hoped to publish at least 2 of these maps this year. The maps are available for inspection at this office.

---

[1] Resident Geologist, 1496 Wellington St. East, Sault Ste. Marie, Ontario. Manuscript received by The Director, Geological Branch, 11 Jan. 1968.

A previously published compilation map of the Elliot Lake - Blind River area was up-dated and re-published.

The writer is also engaged in a field mapping project covering 8 townships and all, or portions of, 7 mining locations in the Batchawana area, located 40 miles north of Sault Ste. Marie. Some office time was devoted to plotting field data on geological maps of the area, and to petrographic study of rock specimens from the area. Four geological maps, at the scale of 1 inch to ¼ mile, and a paper have been published. Other maps, in advanced stages of preparation, are available for inspection at this office. A general account of the geology of the region may be found in Summary of Field Work, 1967, Ontario Department of Mines Miscellaneous Paper 11, pages 38-40.

Field work duties are summarized below.

One inspection was made concerning a reported discovery of valuable mineral in place upon an island in Lake Huron.

The writer assisted a prospector in logging several thousand feet of drill core.

Visits were made to 2 operating mines, 1 mine being readied for production, and several mineral deposits in the district.

A reconnaissance survey was made of the coast of Lake Superior west of Wawa, in the region extending from a point 5 miles west of the mouth of the Pukaskwa River to a point 16 miles east of the river's mouth. Results are described later in this report.

A geological survey was made of outcrops exposed on the newly completed section of Highway 101, from the point where this highway leaves Highway 129, 7 miles south of Chapleau, to the point where it meets Highway 17, 1 mile south of Wawa, a total distance of 81 miles. Results of this survey have been published as Ontario Department of Mines Preliminary Geological Map No. P.423.

Most of the field season was devoted to geological mapping in the Batchawana area.

Properties Examined

Gaudette township

Michigan Mining and Milling Company, Limited[1]

The company held a molybdenite prospect located in Gaudette township in 1966. In that year a small amount of molybdenite-bearing rock was mined from an open-pit, and trucked to a mill under construction, located 1 mile north of Searchmont. The mill did not operate in 1966 nor in 1967.

The writer visited the property in June, 1967. The mill building and all equipment had been completely removed from the property.

[1] #1 on key map. (See Figures 1a, 1b).

Gould township

Rothsay Mines, Limited (Cheney Mine)[1]

In the latter part of 1966 Rothsay Mines, Limited, entered into an agreement with Copper Concentrators, Limited. The old Cheney Mine workings were rehabilitated in 1966, and early in 1967 some copper-bearing rock was mined. Approximately 3,500 tons of this material was trucked to the mill of Copper Concentrators, Limited, in Township 168. Some of the material was stockpiled at the mine site. Operations ceased in April. In September the stockpile remained at the mine site.

Chalcopyrite and pyrite occur in a quartz-carbonate vein system cutting Gowganda conglomerate. The vein system strikes easterly and dips 45° to 60° S. The width of the vein system varies from about 2 feet to 17 feet, but in the vicinity of the mine the average width is 4 feet to 6 feet. Prior to the recent operations described above, the deposit was estimated to contain 13,455 tons grading 5.6% Cu above the 150-foot level.[2]

1. #2 on key map.
2. Thomson, J. E., et al. 1957. Copper, nickel, lead, and zinc deposits in Ontario. Ont. Dept. of Mines Metal Resources Circular No. 2. p.73-74.

Montreal Mining Company Sand Bay Location

Coppercorp, Limited, and North Canadian Enterprises[1]

Coppercorp, Limited, under a lease arrangement with North Canadian Enterprises, is producing copper from the company's property located about 40 miles northwest of Sault Ste. Marie.

Rocks in the vicinity of the mine consist of Middle Keweenawan basaltic flows and conglomerates.

The ore zones consist of fissure-filling calcite-quartz veins, which contain chalcocite, bornite, chalcopyrite and specularite. Native copper occurs in some veins, but it is not an economically important ore mineral.

The ore zones occur in fault zones which strike northwesterly to northeasterly, and which dip 55° to 70° E. Average width of the zones is in the order of 8 feet.

Production is at the rate of about 500 tons per day. Published ore reserves are 1,545,000 tons grading 2.01% Cu[2].

---

1. #3 on key map.
2. Northern Miner, July 14, 1966.

Township 23, Range 13

World Mining Explorations, Limited, and Victoria Algoma Mineral Company, Limited[1]

In late autumn of 1967, L. T. Brennan of Toronto, prospecting on behalf of J. Hamilton of Toronto, made a discovery of lead-zinc-silver-copper mineralization in Township 23, Range 13, located about 45 miles northeast of Sault Ste. Marie. Numerous claims were staked surrounding the discovery, and were subsequently acquired by World Mining Explorations, Limited, and an associated company, Victoria Algoma Mineral Company, Limited.

The writer visited the property early in November, at which time snow covered most outcrops in the area. Bedrock was exposed only in the walls of trenches put down in the mineralized area, and in a few nearby steep-sided outcrops.

The mineralized area is located 2½ miles north and ½ mile west of the southeast corner of the township, on claim S.S.M. 89786.

The pits referred to hereafter consist of shallow trenches, a few feet deep, which strike north.

#1 Pit, sunk upon the discovery outcrop, is located 230 feet, S 75° E of #4 post, claim S.S.M. 89786. At the north and south ends of the trench, silicified chloritic schists (possibly representing altered felsic metavolcanics) are exposed. The schistosity strikes N 80° W and dips south at 75° - 90°. Narrow seams of pyrite and pyrrhotite occur on schistosity surfaces.

[1] #4 on key map.

Between the exposures of schist, a 4-foot width of fractured quartz is exposed. The quartz contains coarse-grained masses and veinlets of pyrite, sphalerite, galena, and graphite.

#2 Pit is located 45 feet, S 35° E of #1 Pit. Schist similar to that seen in #1 Pit is exposed at the north end of the pit, over a width of 1 foot. The remainder of the pit exposes a 4 to 5-foot width of fractured quartz which carries galena, sphalerite, pyrite, and graphite.

#3 Pit is located 65 feet S 80° E of #2 Pit. Schist is exposed at the north end of the pit, over a width of 1 foot. South of the schist, and over a width of 6 to 7 feet, fractured quartz is exposed. The quartz contains galena, sphalerite, pyrite, and graphite.

An unnumbered pit, located 15 feet south of the south end of #3 Pit, exposes silicified graphite-rich schist over a width of 10 feet. Narrow streaks and lenses of fine-grained quartz are common, and trend parallel to schistosity surfaces. Narrow veinlets consisting of pyrite, chalcopyrite, and galena also trend parallel to the schistosity surfaces.

#4 Pit Area, consisting of 2 parallel trenches 5 feet apart, is located 110 feet S 60° W of #1 Pit. In these trenches, each about 10 feet long, fine-grained, dark-coloured, graphite-rich schist is exposed. Schistosity strikes, in general, N 55° W, and dips 75° to 85° S. In detail the schist is much contorted: fold axes trend parallel to the strike of schistosity and plunge southeast at 80° to 85°.

Narrow veinlets of pyrite, pyrrhotite, and chalcopyrite, both with and without accompanying quartz, occur in the schist. These veinlets generally trend parallel to the schistosity, but locally cross-cut the schistosity.

North of all the pits described above, fragmental and banded felsic metavolcanic rocks occur, at 3 outcrops located on the claim boundary 100 and 120 feet east of #4 post, claim S.S.M. 89786, and 200 feet S 77° E of this post.

Subsequent to the writer's visit, an electromagnetic survey has been carried out, and diamond-drilling has been commenced.

Township 28, Range 13

Tribag Mining Company, Limited[1]

The company's property consists of mining claims S.S.M. 35127-43; 35168-69; 61111-41; 62168; 62183; 62192-93; 62199-62207; 63426-28; 63716; 63642-58; 63112-25; 82563-71 in Township 28, Range 13; and claims S.S.M. 62184-91; 62194-98; 62208-12; 63397-99; 63417-18; 63425 in adjacent Township 27, Range 13. Both townships are located 40 miles north of Sault Ste. Marie.

Rocks in the vicinity of the mine consist of Archean greenstones and granitic rocks. Host rock for the ore deposits is a polymictic breccia, consisting of coarse angular fragments of granite, greenstone, diabase, and felsite, cemented by a coarsely-crystalline vuggy matrix of quartz and carbonate. Chalcopyrite and pyrite, with minor sphalerite and galena, are found in the matrix of the breccia. The sulphides tend to form domical sheets within the breccia mass. Late basic dikes and faults cut the ore zones.

The breccia mass is pipe-like in shape, being somewhat elliptical in plan, and having steeply-dipping walls. At surface the pipe is 1,300 feet long and 400 feet wide. The walls dip steeply outward, and thus the breccia widens as depth increases, reaching a width of over 900 feet on the 1,200-foot level. The breccia is at least 1,613 deep, as measured from surface.

The breccia appears to be a diatreme, probably associated with the Middle Keweenawan volcanic activity which profoundly affected the region.

The mine was placed in production in May, 1967, at the rate of about 400 tons per day. Ore reserves have been estimated at 600,000 tons grading 2.2% Cu[2].

1. #5 on key map.
2. Northern Miner, March 30, 1967.

Township 29, Range 23

Surluga Gold Mines, Limited[1]

This company is currently carrying out underground development and surface plant construction with the objective of placing its gold deposit in production during the summer of 1968.

The company's property is located 1 mile southeast of Wawa, and consists of the following claims: S.S.M. 59662-64; 60183-85; 60362-63; 60942; 61530-33; 61954-72; 64595; 64700-06; 64934; 64955; 73832; 79261-67; 86880-83.

A 3-compartment vertical shaft has been sunk to a depth of 960'. Seven levels have been established, at depths of 164', 290', 416', 542', 668', 794', 920'. Several thousand feet of underground development have been carried out.

The mill currently under construction has a rated capacity of 750 tons per day.

The gold deposit occurs within a large shear zone traversing dioritic rocks. The shear zone, known as the Jubilee shear, strikes N 10° E, and on the average, dips 40° E. Rocks within the shear zone consist of varied muscovite-chlorite-carbonate-quartz schists, carbonate and quartz veins.

The schists are in places mineralized with pyrite, arsenopyrite, and gold. Quartz veins, often carrying tourmaline, are occasionally auriferous. From present data the auriferous zones appear to be tabular bodies, generally conformable with the Jubilee shear zone.

An exception to this generality occurs on the 7th level, in the footwall of the Jubilee shear zone, where a potential ore zone has been followed within a steeply-dipping shear zone.

Lamprophyre dikes cut the auriferous zones.

Published ore reserves, based on the original surface drilling data, are 237,335 tons grading 0.273 oz. Au per ton[2].

1. #6 on key map.
2. Northern Miner, September 28, 1967.

Part 2

Summary of Staking, Exploration, Development and Mineral Production in 1967

(a) Staking

Most of the claim-staking activity within the Sault Ste. Marie Resident Geologist's district took place near the north shore of Lake Huron. Prompted by a rising interest in prospecting for uranium deposits, approximately 2,700 claims were recorded from this region, principally from within an east-west trending belt which extends for about 50 miles west and about 12 miles east of Elliot Lake, (A on key map). Within this area, a few claims were staked as copper prospects.

In order to give a picture of the general staking pattern within this large region, the townships concerned are listed below, and the approximate number of claims recorded from each in 1967 are given in brackets.

These townships are:

Galbraith (100); Gould (180); Grasett (160); Haughton (190); Mack (150); Montgomery (170); Morin (180); Otter (50); Proctor (20); Scarfe (80); Striker (20); Victoria (10); 1A (30); 1B (120); 137 (40); 138 (30); 143 (20); 150 (20); 151 (60); 161 (220); 163 (80); 167 (260); 168 (60); 169 (120); 175 (150); 176 (70); and 182 (140).

Approximately 300 claims were staked in the vicinity of reported radioactive mineral occurrences near Ranger and Saymo Lakes, in Townships 4G and 5G. This area is located 50 miles northeast of Sault Ste. Marie. (B on key map).

Numerous small groups of claims were staked near Sault Ste. Marie, evidently upon base metal prospects, in the townships of Aweres; Deroche; Jarvis; Shields; and Township 23, Range 10. (C on key map).

A few claims were staked in Township 27, Range 13; and Township 28, Range 13; in the vicinity of the Tribag Mine. (5 on key map).

Early in the year, approximately 300 claims were staked in claim-map areas M.13 and M.8 (Pukaskwa River and Abbie Lake areas, respectively), located 35 miles northwest of Wawa, near a recent copper discovery. (D on key map).

A few claims were staked in the vicinity of gold deposits in Lizar township, located 60 miles northeast of Wawa. (E on key map).

Discovery of a lead - zinc - silver - copper deposit in Township 23, Range 13, 45 miles northeast of Sault Ste. Marie, sparked a staking rush late in the year. (4 on key map). Approximately 400 claims were staked in this and adjacent Township 22, Range 13. The owner of the deposit, Victoria Algoma Mineral Company, Limited, has acquired mining rights to 4 nearby townships owned by the Algoma Central Railway. These are Township 24, Range 13; Township 25, Range 13; Township 24, Range 15; and Township 24, Range 16. (F on key map).

Part 2

(b) Exploration

Exploration work in 1967 was largely concentrated in the Elliot Lake - Sault Ste. Marie area. Most of the work was designed to find or evaluate uranium deposits. A very minor part of the exploration work within this region was devoted to copper deposits.

Other regions, in which significant amounts of exploratory work were done, and metals of interest, are the Pukaskwa River area (copper prospect); Dalton area (copper-nickel prospect), and Goudreau area (gold prospect).

Programs of general regional prospecting were carried out in the Batchawana and Wawa areas.

The following review, in order to avoid repetition of much of the detail found in Part 4 of this report, notes only some highlights of the work performed.

In the Elliot Lake region several companies, as listed below, drilled deep holes in search for, or evaluation of known uranium deposits.

Denison Mines, Limited, under terms of an agreement with Candore Explorations, Limited, carried out drilling on the latter's property in Township 156.

Falconbridge Nickel Mines, Limited, is reported to have drilled a deep hole near the west end of Matinenda Lake in Township 167.

Green Valley Mines, Limited, under terms of an agreement with North Rock Explorations, Limited, carried out drilling on the latter's property located in Township 144. Late in the year, Stanrock Uranium Mines, Limited, commenced drilling on the property.

Kerr-McGee Corporation drilled deep holes in Townships 143, 150, and 155.

Preston Mines, Limited, drilled deep holes in Township 149.

In Mack township, Rose Mountain Mines, Limited, drilled one deep hole, as did Parkdale Explorations, Limited, in Long township.

Stanrock Uranium Mines, Limited, carried out drilling on a property located near Crotch Lake in Township 149.

In the field of base-metal exploration in the Elliot Lake region, Noranda Mines, Limited, carried out drilling on a copper prospect located in Township 163. The property was optioned from Jonsmith Mines, Limited.

In the Pukaskwa River area, International Bibis Tin Mines, Limited, carried out drilling upon a copper prospect. (D on key map).

Multi-Minerals, Limited, drilled a copper-nickel prospect located near Dalton, about 30 miles east of Wawa. (G on key map).

Lake Kozak Mines, Limited, is currently carrying out a program of underground exploration on the company's gold prospect located in Township 28, Range 26, Goudreau area, 18 miles northeast of Wawa. (H on key map).

In the Batchawana area, 40 miles north of Sault Ste. Marie, Noranda Mines, Limited, carried out a regional prospecting program in Township 26, Range 14; Township 26, Range 15; and Township 27, Range 14. In adjoining Township 25, Range 14, Canex Aerial Exploration, Limited, also carried out a general prospecting program. (I on key map).

Acme Gas and Oil Company, Limited, continued a program of airborne geophysical surveying and related ground work in a block of 10 townships centered 16 miles northwest of Wawa. Townships involved are Townships 29 to 33, Ranges 25 and 26, inclusive. (J on key map).

(c) Development

Algoma Ore Division, Algoma Steel Corporation, Limited

Algoma Ore Division, Algoma Steel Corporation, Limited, prepared the Lucy iron deposit for production. Mining will be by open-pit methods. The deposit is located in Township 28, Range 24; and Township 29, Range 24; approximately 8 miles northeast of Wawa. (K on key map).

Rio Algom Mines, Limited

A new shaft is being sunk to a depth of 2,260 feet at the company's Quirke Lake uranium property in Township 150, 8 miles north of Elliot Lake. Initial production from the new workings is expected in 1968. The old Quirke mill is being rehabilitated, and its capacity will be increased to 3,700 tons per day.

Surluga Gold Mines, Limited

Surluga Gold Mines, Limited, is currently preparing the company's gold deposit for production in mid-1968.

The property is located in Township 29, Range 23, about 1 mile southeast of Wawa.

A description of the property will be found elsewhere in this report, in the section concerning properties examined. (6 on key map).

(d) Mines Opened, Closed, in 1967

Rothsay Mines, Limited, (Cheney Mine)

The Cheney Mine of Rothsay Mines, Limited, Gould township, operated briefly from January to April. Approximately 3,500 tons of copper-bearing rock were trucked to the mill of Copper Concentrators, Limited, located in Township 168.

The Cheney property is described elsewhere in this report, in the section devoted to properties examined. (2 on key map).

Tribag Mining Company, Limited

Tribag Mining Company, Limited, began production of copper concentrates in May. The company's property is located in Township 28, Range 13, and is described elsewhere in this report, in the section concerning properties examined. (5 on key map).

Annual Report of Resident Geologists' Section

Part 3 (a)

New Geological Information
Bearing on Future Prospecting and Exploration

Native Copper, Kincaid township[1]

Late in the autumn of 1967 native copper was discovered at a new locality on the east shore of Lake Superior, about 1 mile northeast of Mica Bay, Kincaid township.

Native copper, associated with carbonate and other, as yet unidentified minerals, occurs in a fracture zone in Archean granitic rocks. Thick snow cover has prevented an adequate examination of the surface exposures of this deposit. From present meagre data, the fracture zone appears to strike northerly, have a width of about 4 feet, and a known strike length of about 100 feet.

The deposit is noteworthy in that it represents the first reported occurrence of native copper in Archean host rocks in this district. The copper mineralization is almost certainly of Middle Keweenawan age, similar to that which has affected nearby Middle Keweenawan lavas and sediments.

1. L on key map.

General Geology, Lake Superior Coast, Pukaskwa River Area[1]

A brief reconnaissance survey was made of a portion of the coast of Lake Superior north of Michipicoten Island. The area examined extends from 5 miles west of the mouth of the Pukaskwa River, to a point 16 miles east of the river's mouth.

Published aeromagnetic maps show the region to be characterized by a pattern of high, generally linear, anomalies, not unlike those caused by Middle Keweenawan lavas of Michipicoten Island and the Mamainse Point area. Geological data from the area are very scarce, and it was considered possible that the magnetic pattern reflected the presence of presently unmapped Middle Keweenawan volcanics.

The survey revealed that the magnetic pattern is caused by a swarm of diabase dikes. The dikes range in width from a few inches to 50 feet, with most exhibiting widths of from 20 to 40 feet. They strike northwesterly and dip steeply, both to the southwest and northeast. Columnar jointing is a very common feature.

Some revision of existing geological maps of the area is required, but this must await more detailed mapping. Pending such work, some observations made along the coast are noted below.

Metasediments, striking N 45° E and dipping 70° W, underlie the west part of the bay 2 miles north of the mouth of the Pukaskwa River. Granite, migmatite, pegmatite, and diabase dikes form the coast for the next 3 miles to the west.

Southeast of the Pukaskwa River, granite and a swarm of diabase dikes comprise the coast, except for an interval extending from 2¾ miles to 9 miles east of the river's mouth, wherein northeast-striking basic metavolcanics are exposed.

1. M on key map.

Circular Aeromagnetic Anomalies, Mammamattawa Area[1]

Aeromagnetic maps[2] released late in 1967 revealed several prominent circular anomalies located near Mammamattawa, about 60 miles northwest of Hearst, in an area underlain by Paleozoic sediments of the Hudson Bay Lowlands.

The anomalies aroused the immediate interest of prospectors. In view of this interest, some comments on the area are timely.

The southernmost, and largest, of the anomalies was discovered in 1961 by Algoma Ore Division, Algoma Steel Corporation, Limited. Inasmuch as the anomaly suggested the presence of an alkaline intrusive body, with possible associated iron and niobium mineralization, the company acquired a Licence of Occupation covering the anomaly. In 1964 a ground magnetic survey was carried out, and 9 holes, with a total depth of 4,307 feet, were drilled.

Drilling showed overburden to range in thickness from 34 feet to 127 feet.

The Paleozoic sediments have a fairly uniform thickness of 400 feet. They consist largely of limestone, with minor interbeds of sandstone, siltstone, and gypsum. A thin basal clastic unit marks the Precambrian-Paleozoic unconformity. This unit varies in composition from limy sandstone to conglomerate, and ranges in thickness from 3 to 18 feet.

Beneath the sediments, the drill holes encountered a medium to coarse-grained alkaline syenite. Magnetite is a prominent accessory mineral, and its presence is the cause of the anomaly. The drill core was not assayed for its iron content. The niobium content was found to range from 0.01 to 0.06% Nb_2O_5.

The company's Licence of Occupation has subsequently lapsed.

It is most probable that the other circular anomalies in the vicinity are also caused by alkaline intrusive bodies.

Those prospecting in the area should be prepared to drill through at least 400 feet of Paleozoic sediments to reach the bodies causing the anomalies.

Although the thought has been expressed that alkaline intrusive bodies in this area may be intrusive into the Paleozoic sediments, and might therefore be encountered at shallower depths, this is unlikely for the bodies under consideration. Analysis of logs of the Algoma Ore Division holes indicates that the lowermost Paleozoic member includes a regolith consisting in large part of syenite fragments, a situation clearly recognized by the Algoma Ore Division geologists.

Given the pre-Paleozoic age of the body drilled by Algoma Ore Division, it is exceedingly unlikely that any other nearby alkaline intrusives will prove younger, or be found to extend above the Precambrian-Paleozoic unconformity.

1. N on key map.

2. Ontario Department of Mines - Geological Survey of Canada, 1967; Geophysics Paper 3913, Limestone Rapids. Geophysics Paper 3914, Mammamattawa. Geophysics Paper 3915.

Annual Report of Resident Geologists' Section

Part 3 (d)

New Maps and Literature

Introduction

Listed below are maps and literature pertaining to the Sault Ste. Marie Resident Geologist's district.

Publication date in all cases is 1967.

Anonymous	Iron Ore, 1966. American Iron Ore Association, Cleveland, Ohio. 135 pages.
Armbrust, G.A.	Wallrock alteration and paragenesis of the Tribag Mine, Batchawana Bay, Ontario. Ph. D. thesis, University of Colorado. 78 pages.
Bennett, G., et al	Pivabiska River Sheet, District of Cochrane. (42 J/SW, part of 42 G/NW). Geological compilation series. Scale 1 inch to 2 miles. Ont. Dept. Mines Map P.395.
------------------	Hearst Sheet, District of Cochrane. (42 G/NW). Geological compilation series. Scale 1 inch to 2 miles. Ont. Dept. Mines Map P.397.
------------------	Operation Kapuskasing. Ont. Dept. Mines M.P.10. 98 pages.
Cannon, W. F.	Nature and age of orogenesis in the Cutler area, Ontario. Abstract. Geol. Soc. Am., Northeastern Section, Second Annual Meeting Program. p.18-19.
Carlson, H. D., and	Donovan, J. F. Chapleau - Foleyet Sheet, Districts of Algoma, Cochrane, and Sudbury. (41 O, 42 B). Geological compilation series. Scale 1 inch to 4 miles. Ont. Dept. Mines Map 2116.
Colwell, J. A.	Geochemistry of the Nipissing Diabase. Abstract. 13th Annual Institute on Lake Superior Geology. p.7.
Fenwick, K. G.	Dayohessarah Lake Area, District of Algoma. (42C, 42F). Ont. Dept. Mines G.R.49. 16 p. Includes Map 2129, scale 1 inch to 2 miles.

Frarey, M. J. Three new Huronian formational names. Geol. Sur. Can., Paper 67-6. 3 p.

George, P. T. Operation Kapuskasing Area, Districts of Cochrane and Algoma. Aeromagnetic - geological compilation. Scale 1 inch to 16 miles. Ont. Dept. Mines Map P.420.

Giblin, P. E. Highway 101, Chapleau to Wawa, Districts of Algoma and Sudbury. (41 N/15, 41 N/16, 41 O/13, 41 O/14, 42 C/2). Scale 1 inch to 1 mile. Ont. Dept. Mines Map P.423.

-------------- Batchawana Area, District of Algoma. Summary of Field Work, 1967. Ont. Dept. Mines M.P. 11, p.38-40.

Giblin, P. E. and Leahy, E. J. Blind River - Elliot Lake Sheet, Districts of Algoma and Sudbury. (41 J). Geological compilation series. Scale 1 inch to 2 miles. Ont. Dept. Mines Map P.304. (re-issued)

------------------------------- Sault Ste. Marie - Elliot Lake Sheet, Districts of Algoma, Manitoulin, and Sudbury. (41 J, 41 K, 41 N, 41 O). Geological compilation series. Scale 1 inch to 4 miles. Ont. Dept. Mines Map 2108.

Giguere, J. F. Granitehill Lake Area, Districts of Thunder Bay and Algoma. Summary of Field Work, 1967. Ont. Dept. Mines M.P. 11, p.35-37.

Gittens, J., et al The ages of carbonatite complexes in Eastern Canada. Can. Jour. Earth Sciences, v. 4, p.651-655.

Goldich, S. S. Geochronology in the Lake Superior region. Abstract. 13th Annual Institute on Lake Superior Geology. p.13.

Guillet, G. R. The clay products industry of Ontario. Ont. Dept. Mines Industrial Mineral Report 22, p. 147-149.

Halls, H., and West, G. F. Identification of seismic refractors in the Lake Superior syncline. Abstract. 13th Annual Institute on Lake Superior Geology. p.14.

Hewitt, D. F. 1967. Pyrite deposits of Ontario. Ont. Dept. Mines M.R.5, p.17-31.

Hofmann, H. J. Precambrian fossils (?) near Elliot Lake, Ontario. Science, v. 156, p.500-504.

Innes, M. J. S., and Goodacre, A. K. Gravity anomalies over Lake Superior and surrounding area and their structural implications. Abstract. 13th Annual Institute on Lake Superior Geology. p.22.

Killeen, P. G. Gamma - ray spectrometer survey, Elliot Lake. Report of Activities, Part A: May to October, 1966. Geol. Surv. Can. Paper 67-1, Part A., p.148.

Knight, C. J. Rubidium - strontium isochron ages of volcanic rocks on the north shore of Lake Huron, Ontario. Ph. D. thesis, University of Toronto. 166 pages.

Lewis, C. F. M. Post-glacial uplift studies in northern Lake Huron basin. Report of Activities, Part A: May to October, 1966. Geol. Surv. Can. Paper 67-1, Part A, p.150-151.

Liberty, B. A. Stratigraphic studies of Middle Ordovician and Cambrian strata in the St. Joseph Island - Sault Ste. Marie area. Report of Activities, Part A: May to October, 1966. Geol. Surv. Can. Paper 67-1, Part A, p.154-155.

Meyer, R. P., and Ocola, L. Relationship between seismic and aeromagnetic surveys in eastern Lake Superior. 13th Annual Institute on Lake Superior Geology. p.28.

Ontario Department of Mines - Geological Survey of Canada. Aeromagnetic maps. Scale 1 inch to 1 mile.

Geophysics Paper 3911. Nassau Lake. 42 F/9.

Geophysics Paper 3912. Constance Lake. 42 F/16.

Geophysics Paper 3913. Limestone Rapids. 42 K/1.

Geophysics Paper 3914. Mammamattawa. 42 K/8.

Geophysics Paper 3915. 42 K/9.

Geophysics Paper 3916. Trilsbeck Lake. 42 K/16.

Geophysics Paper 3917. Nest River. 42 N/1.

Geophysics Paper 3918. 42 N/8.

Geophysics Paper 3934. Hearst. 42 G/12.

Geophysics Paper 3935. Hanlan Lake. 42 G/13.

Geophysics Paper 3936. 42 J/4.

Geophysics Paper 3937. 42 J/5.

Geophysics Paper 3938. 42 J12.

Geophysics Paper 3939. Pledger Lake. 42 J/13.

Geophysics Paper 3940. Awagakama River. 42 O/4.

Geophysics Paper 3941. Chemahagan River. 42 O/5.

Geophysics Paper 3958. Shannon Lake. 42 G/14.

Geophysics Paper 3959. Thunder House Falls. 42 J/3.

Geophysics Paper 3960. 42 J/6.

Geophysics Paper 3961. 42 J/11.

Geophysics Paper 3962. 42 J/14.

Geophysics Paper 3963. 42 O/3.

Geophysics Paper 3964. 42 O/6.

Overton, A. Seismic studies, Elliot Lake area. Report of Activities, Part A: May to October, 1966. Geol. Surv. Can. Paper 67-1, Part A, p.155-157.

Riley, R. A. Glasgow township, District of Algoma. (42 C/8). Scale 1 inch to ¼ mile. Ont. Dept. Mines Map P.402.

------------ Meath township, District of Algoma. (42 C/8). Scale 1 inch to ¼ mile. Ont. Dept. Mines Map P.403.

------------ Rennie township, District of Algoma. (42 C/8, 42 B/5). Scale 1 inch to ¼ mile. Ont. Dept. Mines Map P.404.

Robertson, J. A. 1967. Recent geological investigations in the Elliot Lake - Blind River uranium area, Ontario. Ont. Dept. Mines M.P.9. 31 pages.

Robertson, J. A. 1967. Geology of the Spragge area. Ont. Dept. Mines Open File Report 5010. 172 pages.

Robertson, J. A., and Abraham, E. M. Township 149, District of Algoma. (41 J/7). Scale 1 inch to ¼ mile. Ont. Dept. Mines Map 2113.

------------------------------------ Township 150, District of Algoma. (41 J/7, 41 J/10). Scale 1 inch to ¼ mile. Ont. Dept. Mines Map 2114.

Secor, G.B. et al. An aeromagnetic survey of Lake Huron. Abstract. 13th Annual Institute on Lake Superior Geology. p.36.

Steinhart, J.S., et al. Heat flow in Lake Superior. Abstract. 13th Annual Institute on Lake Superior Geology. p.37.

Wold, R. J. Progress of geophysical studies in Lake Superior. Abstract. 13th Annual Institute on Lake Superior Geology. p.42.

Wood, J. Rawhide Lake Area (Townships U and Q), District of Algoma. Summary of Field Work, 1967. Ont. Dept. Mines M.P.11, p.40-42.

Wanless, R.K., et al. Age determinations and geological studies. K-Ar isotopic ages, report 7. Geol. Surv. Can. Paper 66-17, p.84-85.

West, G. F. Lake Superior Study. Canadian Upper Mantle Report, 1967. Geol. Surv. Can. Paper 67-41, p.185-195.

Young, G. M. Possible organic structures in early Proterozoic (Huronian) rocks of Ontario. Can. Jour. Earth Sciences, v.4, p.565-568.

Annual Report of Resident Geologists' Section
Part 4
New Information Added to Files,
January 1 - December 31, 1967
Sault Ste. Marie Resident Geologist's Office

Introduction

During 1967, new geological, geophysical, and other data of interest to prospectors, was received concerning 134 townships, mining locations, islands in the Great Lakes, and unsurveyed claim-map areas.

New information comprises data submitted to the Ontario Department of Mines for assessment work credit; data donated to the Department by mining companies and individuals; quarry permits issued by the Department; data received from the Ontario Securities Commission; and data submitted to the Department by the Algoma Central Railway under terms of a formal agreement. This information is added to numbered assessment work files.

Information reported in the press, principally the Northern Miner, is also added systematically to a separate, unnumbered press clippings file.

Data received in 1967 consist of 107 geological surveys; 56 geophysical surveys; 25 quarry permits; 25 reports of stripping and trenching; 59 reports of drilling with a reported total of 181,126.1 feet of core. Assay results were included in 39 reports. There were 57 companies mentioned in relevant press items.

Geophysical surveys reported herein are ground surveys unless specifically listed as airborne surveys.

Abbreviations used in the text are listed below:

A.C.R.	Algoma Central Railway
A.W.	Assessment work
O.D.M.	Ontario Department of Mines
O.S.C.	Ontario Securities Commission
P.C.	Press clipping

Aberdeen township

Rock Lake Mine; East Sullivan Mines, Limited.
Geological and summary reports.
Drill logs; 8 holes; 3,509'. Cu assays.
Donated to O.D.M.
File SSM-41.

Anderson township

Glendale Mines and Properties, Limited.
Geological report.
From A.C.R.
File SSM-44.

Auden township

Colleen Copper Mines, Limited.
Magnetic and electro-magnetic surveys.
A.W.
File SSM-699.

Williams Iron Mine.
Geological report. Fe, S, P analyses.
From A.C.R.
File SSM-1132.

Aweres township

Kennco Explorations (Canada), Limited.
Geological survey.
A.W.
File SSM-953.

Bridgland township

Band-Ore Gold Mines, Limited.
Drill logs; 2 holes; 649'.
A.W. P.C.
File SSM-1165.

Paynter, R.
Drill logs; 8 holes; 973.5'.
A.W.
File SSM-1108.

Chapleau township

Collings, W. H.
Quarry permit.
File SSM-1064.

Cholette township

Falconbridge Nickel Mines, Limited.
Geological survey.
Donated to O.D.M.
File SSM-1052.

Deroche township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-808.

Algoma Galena Company.
(Kirby - Legge claims).
Drill logs; 35 holes; 18,209.1'. Pb, Zn, Ag, Au, Fe assays.
From A.C.R.
File SSM-13.

Campbell-Murdoch Iron Showings.
Geological report. Fe assays.
From A.C.R.
File SSM-1125.

Edgar, G. M.
Geological reports.
Drill logs; 2 holes; 942'.
From A.C.R.
File SSM-1138.

Deroche township, cont'd.

Feldstein, H. E.
Geological report. Fe, Pb, Zn, Ag assays.
A.W.
File SSM-1124.

Jardun Mines, Limited.
Geological report.
From A.C.R.
File SSM-10.

Jarviston Mines, Limited.
Geological report.
From A.C.R.
File SSM-12.

Newconex Canadian Exploration, Limited.
Magnetic, electro-magnetic, and self-potential surveys.
From A.C.R.
File SSM-1143.

North Tech Exploration, Limited.
Drill logs; 9 holes; 1,608.5'.
From A.C.R.
File SSM-18.

Scott, E.
Drill logs; 11 holes; 3,117.8'.
Pb, Zn, Ag assays.
From A.C.R.
File SSM-1140.

Scott, F.
Geological report. Pb, Zn, Au, Ag assays.
From A.C.R.
File SSM-1136.

Sudbury Crater Mining Company, Limited.
Geological report. Pb, Zn, Ag, Au assays.
Drill logs; 15 holes; 2,978'.
From A.C.R.
File SSM-1139.

Wierenga Claims.
Drill logs; 3 holes; 240.4'.
From A.C.R.
File SSM-1141.

Williams Iron Mine.
Geological report. Fe, S, P analyses.
From A.C.R.
File SSM-1132.

Drew township

Delmico Mines, Limited.
Electromagnetic survey.
A.W.
File SSM-1042.

Falconbridge Nickel Mines, Limited.
Geological survey.
Donated to O.D.M.
File SSM-1052.

Elliot Lake Area

Con-Shawkey Gold Mines, Limited.
P.C.

Union Mining Corporation.
P.C.

Fisher township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1109.

Foch township

Delmico Mines, Limited.
Electromagnetic survey.
A.W.
File SSM-1042

Galbraith township

Imperial Oil Enterprises.
P.C.

Mississagi Syndicate.
P.C.

Gaudette township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1122.

Gaudette township, cont'd.

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1123.

Alur Mines, Limited.
Geological plan.
From A.C.R.
File SSM-29.

Gill township

Boutin Transport & Construction, Limited.
Quarry permit.
File SSM-1068.

Gould township

Beaudin, R.
Stripping, trenching.
A.W.
File SSM-1100.

Imperial Oil Enterprises.
P.C.

Lebel, A.
Stripping, trenching.
A.W.
File SSM-1099.

Lord Prospect.
Drill log; 1 hole; 325'.
A.W.
File SSM-1149.

Mississagi Syndicate.
P.C.

Pellerin, A.
Stripping, trenching.
A.W.
File SSM-1126.

Pellerin, F.
Stripping, trenching.
A.W.
File SSM-1047.

Pellerin, L.
Stripping, trenching.
A.W.
File SSM-1148.

Gould township, cont'd.

Pellerin, U.
Stripping, trenching.
A.W.
File SSM-934.

Poirier, A.
Stripping, trenching.
A.W.
File SSM-1147.

Poirier, G.
Stripping, trenching.
A.W.
File SSM-971.

Poirier, R.
Stripping, trenching.
A.W.
File SSM-1119.

Thibeault, A.
Stripping, trenching.
A.W.
File SSM-1074.

Grasett township

Mississagi Syndicate.
P.C.

Haughton township

Beaudin, A.
Stripping, trenching.
A.W.
File SSM-1162.

Imperial Oil Enterprises.
P.C.

Lebel, U.
Stripping, trenching.
A.W.
File SSM-1164.

Mississagi Syndicate.
P.C.

Havilland township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-749.

Upper Canada Mining Company Location.
Geological report.
File SSM-1159.

Herrick township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1109.

Hodgins township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1123.

Mairs, A. S.
Stripping, trenching.
A.W.
File SSM-1128.

Williams Iron Mine.
Geological report. Fe, S, P analyses.
From A.C.R.
File SSM-1132.

Home township

New Senator-Rouyn, Limited.
Drill logs; 9 holes; 1,506'.
Cu, Ni, MoS_2, Au, Ag, Pt assays.
From A.C.R.
File SSM-1017.

Hunt township

Canadian Pacific Railway.
Quarry permit.
File SSM-1088.

Sauriol, M. J.
Quarry permit.
File SSM-1083.

Hunt township, cont'd.

White River: The Corporation of the
Improvement District of White River.
Quarry permit.
File SSM-1082.

Jarvis township

Base Metals Mining Corporation.
Geological plans.
Drill logs; 14 holes; 3,000'.
From A.C.R.
File SSM-1142.

Carroll, T.
Drill log; 1 hole; 105 feet.
A.W.
File SSM-1101.

Jardun Mines Limited.
Geological report.
Donated to O.D.M.
File SSM-910.

Williams Iron Mine.
Geological report. Fe, S, P analyses.
From A.C.R.
File SSM-1132.

Kincaid township

Algoma Central Railway. (Bjornna Copper Showing).
Geological report. Cu assays.
From A.C.R.
File SSM-1036.

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1037.

Huston, C. C., and Associates.
Geological, geochemical, magnetic,
electro-magnetic and self-potential surveys.
Drill logs; 8 holes; 1,887'. Cu, Au, Ag assays.
Donated to O.D.M.
File SSM-1090.

Kincaid township, cont'd.

Jogran Mines, Limited.
Summary report, geological and induced-polarisation surveys.
Drill logs; 16 holes; 10,189'.
Cu, MoS_2 assays.
File SSM-1167.

Lake Huron, North Channel

Ecstall Mining, Limited.
P.C.

Texas Gulf Sulphur Company, Incorporated.
P.C.

Lake Superior, East Coast

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1161.

Leeson township

Nudulama Mines, Limited.
P.C.

Renabie Mines, Limited.
P.C.

Lewis township

Plum Uranium and Metal Mining, Limited.
Drill logs, 8 holes; 1,655'.
A.W.
File SSM-1030.

Ley township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1105.

Lizar township

Primrock Mining and Exploration, Limited.
P.C.

Long township

D'Aragon Mines Limited.
P.C.

Newrich Explorations, Limited.
Geological, magnetic, electro-magnetic
and radiometric surveys.
A.W. P.C.
File SSM-1146.

Parkdale Exploration, Limited.
Prospectus. Magnetic survey.
Drill log; 1 hole; 1,612'.
A.W.; data from O.S.C.; P.C.
File SSM-1033.

Mack township

Accra Explorations, Limited.
Geological, magnetic, and self-potential surveys;
Au, Cu assays.
A.W.
File SSM-1031.

D'Aragon Mines Limited.
P.C.

Golden Briar Mines, Limited.
Prospectus. P.C.
From O.S.C.
File SSM-1033.

Rose Mountain Mines, Limited.
Prospectus. Magnetic and electro-magnetic surveys.
Drill log; 1 hole; 3,000'.
A.W.; data from O.S.C.
File SSM-1002.

Wee-Gee Uranium Mines, Limited.
Prospectus.
From O.S.C.
File SSM-1076.

Marne township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1098.

Superior Copper Mine.
Geological report.
From A.C.R.
File SSM-39

Maple Island, Lake Superior

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1135.

McGiverin township

D'Aragon Mines, Limited.
P.C.

Michipicoten Island, Lake Superior

Advance Red Lake Gold Mines, Limited.
Drill logs; 10 holes; 10,091'.
Cross-sections, Cu assays.
A.W.
File SSM-955.

Advance Red Lake Gold Mines, Limited.
Geological report.
A.W.
File SSM-1166.

Agnew, Mrs. H. E.
Correspondence re ownership of mineral rights.
Donated to O.D.M.
File SSM-1026.

Montgomery township

Consolidated Sannorm Mines, Limited.
P.C.

Falconbridge Nickel Mines, Limited.
P.C.

Rio Tinto Canadian Exploration, Limited.
Drill log; 1 hole; 3,946'. U_3O_8, ThO_2 assays.
A.W.
File SSM-1060.

Sudbury Contact Mines, Limited.
P.C.

Montreal Mining Company Sand Bay Location

Coppercorp, Limited.
P.C.

Montreal Mining Company Sand Bay Location, cont'd.

North Canadian Enterprises.
P.C.

Morin township

Copper Queen Mine.
Geological report.
From A.C.R.
File SSM-82.

Nameigos township

Cominco, Limited.
Geological report. Au assays.
Donated to O.D.M.
File SSM-1051.

North and South Sandy Islands, Lake Superior

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1111.

Otter township

Cloutier, P. E.
Stripping, trenching.
A.W.
File SSM-1114.

Palmer township

Conwest Exploration Company, Limited.
Geological report; assay plan.
Au, Ag, Co assays.
Drill logs; 2 holes; 139.6'.
Donated to O.D.M.
File SSM-1023.

Jogran Mines, Limited.
Summary report, geological and induced-polarization surveys.
Drill logs; 16 holes; 10,189'. Cu, MoS_2 assays.
Donated to O.D.M.
File SSM-1167.

Palmer township, cont'd.

Phelps-Dodge Corporation of Canada, Limited.
(Jogran Mines, Limited option).
Drill logs; 11 holes; 7,260'.
A.W.
File SSM-944.

Tribag Mining Company, Limited.
Quarry permit.
File SSM-1056.

Plummer township

Rock Lake Mine; East Sullivan Mines, Limited.
Reports; drill logs; 8 holes; 3,509'.
Cross-sections. Cu assays.
Donated to O.D.M.
File SSM-41.

Plummer Additional township

Copper Concentrators, Limited.
P.C.

Huron-Bruce Mines, Limited.
P.C.

Proctor township

Bloxom, S.
Quarry permit.
File SSM-1066.

Elliot Lake: The Corporation of the
Improvement District of Elliot Lake.
Quarry permit.
File SSM-1156.

Kerr-McGee-Corporation.
Drill log; 1 hole; 605'.
A.W.
File SSM-1152.

Rennie township

Martin, W. C.
Drill logs; 11 holes; 1146'.
A.W.
File SSM-842.

Rennie township, cont'd.

Westfield Minerals, Limited.
Magnetic, electro-magnetic, induced polarization, resistivity surveys.
Drill logs; 6 holes; 674.0'.
A.W.
File SSM-1015.

Rose township

Band-Ore Gold Mines, Limited.
P.C.

Pollard, J. G.
Drill log; 1 hole; 32'.
A.W.
File SSM-1154.

Ryan township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1094.

Algoma Central Railway.
Geological report.
Drill logs; 8 holes; 1,793'.
From A.C.R.
File SSM-1096.

Bjornaa-Dale Showings.
Geological report.
From A.C.R.
File SSM-1095.

Canadian Pacific Railway.
Quarry permit.
File SSM-1085.

Consolidated Negus Mines, Limited.
Electro-magnetic survey.
A.W.
File SSM-157.

Jogran Mines, Limited.
Report.
From O.S.C. P.C.
File SSM-1073

Ryan township, cont'd.

Jogran Mines, Limited.
Summary report, geological and induced-polarization surveys.
Drill logs; 16 holes; 10,189'. Cu, MoS_2 assays.
Donated to O.D.M.
File SSM-1167.

McKinney Gold Mines, Limited.
P.C.

Phelps-Dodge Corporation of Canada, Limited.
(Jogran Mines, Limited option).
Drill logs; 11 holes; 7,260'.
A.W.
File SSM-944.

Scarfe township

Wee-Gee Uranium Mines, Limited.
Prospectus.
From O.S.C.
File SSM-1076.

Shedden township

Gradore Mines, Limited.
Drill logs; 9 holes; 3154'. Cu, Au, Ag assays.
A.W.
File SSM-1061.

Panel Consolidated Uranium Mines, Limited.
Drill logs; 7 holes; 3344'.
A.W.
File SSM-165.

Shields township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1123.

Campbell-Murdoch Iron Showings.
Geological report. Fe assays.
From A.C.R.
File SSM-1125.

Shields township, cont'd.

Idziak, B. R.
Stripping, trenching.
A.W.
File SSM-621.

Pitch-Ore Uranium Mines, Limited.
Assay report.
From A.C.R.
File SSM-27.

Simpson township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1102.

Stover township

Duvex Oils & Mines, Limited.
P.C.

Striker township

McMillan, J.
Geological plan. Stripping, trenching.
Donated to O.D.M., and assessment work.
File SSM-1153.

Parkdale Exploration, Limited.
Prospectus; magnetic survey.
A.W.
Data from O.S.C.; P.C.
File SSM-1033.

Rose Mountain Mines, Limited.
Prospectus. Magnetic and electro-magnetic surveys.
A.W.
Data from O.S.C.
File SSM-1002.

Waco Petroleums, Limited.
Magnetic survey.
A.W.
File SSM-1145.

Studholme township

Lecours Lumber Company.
Quarry permit.
File SSM-1092.

Tilley township

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1104.

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
(Begley Copper Location).
Geological reports.
Donated to O.D.M., and from A.C.R.
File SSM-678.

Tupper township

Pitch-Ore Uranium Mines, Limited.
Assay report.
From A.C.R.
File SSM-27.

Vankoughnet township

Byrne, R. H.
Stripping, trenching.
A.W.
File SSM-1144.

Edwards Copper Property.
Geological report.
From A.C.R.
File SSM-1134.

Feldstein, H. E.
Geological report. Fe, Pb, Zn, Ag assays.
A.W.
File SSM-1124.

Township 1D

Winston Mines, Limited.
(Mission Financial Corporation, Limited).
Drill logs; 5 holes; 2,145'.
Au, Ag, Cu assays, trace element analysis.
Magnetic and electro-magnetic surveys.
A.W.
File SSM-773.

Township 1F

Barcis, F.
Stripping, trenching.
A.W.
File SSM-1131.

Township 2E

Lambert, G. F.
Stripping, trenching.
A.W.
File SSM-1151.

Township 4E

Ontario Hydro.
Quarry permit.
File SSM-1058.

Township 22, Range 12

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1110.

Township 23, Range 13

Bruce-Presto Mines, Limited.
P.C.

Agena Mining Company, Limited.
P.C.

Township 23, Range 13, cont'd.

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
Magnetic survey.
A.W.
File SSM-1091.

Victoria Algoma Mineral Company, Limited.
P.C.

Township 23, Range 14

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
Magnetic survey.
A.W.
File SSM-1050.

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
Magnetic survey.
A.W.
File SSM-1091.

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
Magnetic and electro-magnetic surveys.
A.W.
File SSM-1155.

Township 24, Range 11

Superior Copper Mine.
Geological report.
From A.C.R.
File SSM-39.

Township 24, Range 12

McIlraith, C.
Geological report.
From A.C.R.
File SSM-1103.

Township 24, Range 13

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1169.

Township 25, Range 12

McIlraith, C.
Geological report.
From A.C.R.
File SSM-1103.

Township 25, Range 13

Algoma Central Railway.
Geological reports.
From A.C.R.
File SSM-807.

Township 25, Range 14

Algoma Central Railway.
Geological, magnetic and electro-magnetic surveys.
From A.C.R.
File SSM-794.

Rio Tinto Canadian Exploration, Limited.
P.C.

Township 25, Range 15

Rio Tinto Canadian Exploration, Limited.
P.C.

Township 25, Range 25

Multi-Minerals, Limited.
Drill logs; 4 holes; 468'. Cu, Ni assays.
A.W.
File SSM-1130.

Township 26, Range 13

Algoma Central Railway.
Airborne and ground electro-magnetic surveys;
geological survey.
Drill logs; 4 holes; 1,315'.
From A.C.R.
File SSM-1044.

Township 26, Range 14

Algoma Central Railway.
Geological, magnetic, and electromagnetic surveys.
From A.C.R.
File SSM-805.

Township 26, Range 25

Acme Gas & Oil Company, Limited.
Drill logs; 3 holes; 355'.
A.W.
File SSM-1158.

Hamilton (Sweet, Smith Lake) Range.
Geological summary report compiled by
Resident Geologist, Sault Ste. Marie.
File SSM-1049.

Township 27, Range 12

Just, K.
Stripping, trenching.
A.W.
File SSM-1116.

Township 27, Range 13

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1039.

New Senator-Rouyn, Limited.
P.C.

Tribag Mining Company, Limited.
Drill logs; 2 holes, 1158'.
A.W.
File SSM-251.

Tribag Mining Company, Limited.
Geological plan.
A.W.
File SSM-635.

Tribag Mining Company, Limited.
Quarry permit.
File SSM-1056.

Township 27, Range 14

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1039.

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1093.

Township 27, Range 25

Hamilton (Sweet, Smith Lake) Range.
Geological summary report compiled by
Resident Geologist, Sault Ste. Marie.
File SSM-1049.

Township 27, Range 26

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
Geological plan.
Donated to O.D.M.
File SSM-1024.

Jogran Mines, Limited.
Prospectus.
From O.S.C. P.C.
File SSM-1072.

Township 28, Range 13

Algoma Central Railway.
Geological report.
From A.C.R.
File SSM-1038.

New Senator-Rouyn, Limited.
P.C.

Teck Corporation Limited.
P.C.

Tribag Mining Company, Limited.
Drill logs; 2 holes; 1158'.
A.W. P.C.
File SSM-251.

Township 28, Range 13, cont'd.

Tribag Mining Company, Limited.
Quarry permit.
File SSM-1056.

Township 28, Range 14

Primrock Mining & Exploration, Limited.
P.C.

Township 28, Range 15

Canadian Pacific Railway.
Quarry permit.
File SSM-1086.

Primrock Mining & Exploration, Limited.
P.C.

Township 28, Range 23

Algoma Central Railway.
(Peters-Quilty Molybdenite Prospect).
Geological report.
From A.C.R.
File SSM-835.

Township 28, Range 25

Candela Development Company;
Jalore Mining Company, Limited.
Geological, magnetic, electro-magnetic, and self-potential surveys.
Drill cross-sections; 8 holes; 2,095'.
From A.C.R.
Geological summary report, compiled by Resident Geologist, Sault Ste. Marie.
File SSM-1048.

Jogran Mines, Limited.
Prospectus.
From O.S.C. P.C.
File SSM-1071.

Township 28, Range 26

Candela Development Company;
Jalore Mining Company, Limited.
Geological, magnetic, electro-magnetic
and self-potential surveys.
Drill cross-sections; 8 holes; 2,095'.
From A.C.R.
Geological summary report compiled by
Resident Geologist, Sault Ste. Marie.
File SSM-1048.

Ego Mines, Limited.
P.C.

Lake Kozak Mines, Limited.
Prospectus.
Geological, magnetic and electro-magnetic surveys.
Drill logs; 38 holes; 7,732.6'.
Au, Ag, Pb, Zn assays.
From A.C.R., and O.S.C., P.C.
File SSM-867.

Township 29, Range 22

Noranda Mines, Limited.
Geological and magnetic surveys.
Drill logs; 9 holes; 2,512'. S, Fe, SiO_2 analyses.
Donated to O.D.M.
File SSM-1089.

Township 29, Range 23

Miller, H., Jr.
Quarry permit.
File SSM-1057.

Surluga Gold Mines, Limited.
P.C.

Van Sickle, L. A.
Stripping, trenching.
A.W.
File SSM-1129.

Township 29, Range 24

Old Helen Mine, Algoma Steel Corporation, Limited.
Geological summary report, compiled by
Resident Geologist, Sault Ste. Marie.
File SSM-1048.

Township 29, Range 25

Acme Gas & Oil Company, Limited.
P.C.

Township 29, Range 26

Acme Gas & Oil Company, Limited.
P.C.

Township 29, Range 27

Godin, R.
Stripping, trenching.
A.W.
File SSM-1115.

Township 30, Range 19

Canadian Pacific Railway.
Quarry permit.
File SSM-1084.

Renner, G.
Geological report.
From A.C.R.
File SSM-692.

Township 30, Range 22

Abitibi Paper Company, Limited.
Quarry permit.
File SSM-1065.

Acme Gas & Oil Company, Limited.
Airborne magnetic survey.
A.W.
File SSM-1070.

Englund, R. E.
Drill logs; 4 holes; 145'.
A.W.
File SSM-1097.

Township 30, Range 23

Abitibi Paper Company, Limited.
Quarry permit.
File SSM-1065.

Township 30, Range 23, cont'd.

Ward Brothers.
Quarry permit.
File SSM-1059.

Township 30, Range 25

Acme Gas & Oil Company, Limited.
P.C.

Township 30, Range 26

Acme Gas & Oil Company, Limited.
P.C.

Township 31, Range 25

Acme Gas & Oil Company, Limited.
P.C.

Township 31, Range 26

Acme Gas & Oil Company, Limited.
P.C.

Township 31, Range 27

Canadian Pacific Railway.
Quarry permit.
File SSM-1087.

Township 32, Range 25

Acme Gas & Oil Company, Limited.
P.C.

Township 32, Range 26

Acme Gas & Oil Company, Limited.
P.C.

Township 32, Range 27

Abitibi Paper Company, Limited.
Quarry permit.
File SSM-1065.

Township 33, Range 25

Acme Gas & Oil Company, Limited.
P.C.

Township 33, Range 26

Acme Gas & Oil Company, Limited.
P.C.

Township 47

Lang, B. W.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1069.

Township 48

Lang, B. W.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1069.

Pick Mines, Limited.
P.C.

Shaynee Consolidated Mines, Limited.
P.C.

Texron Explorations, Limited.
Geological, magnetic, and electro-magnetic surveys.
A.W.
From O.S.C.
File SSM-967.

Township 123

Beauvale Mines, Limited.
Geological report.
A.W.
File SSM-1120.

Jandon Mines, Limited.
Prospectus.
Drill logs; 5 holes; 1,841'.
A.W.
Data from O.S.C., P.C.
File SSM-1170.

Township 124

Beauvale Mines, Limited.
Geological report.
A.W.
File SSM-1120.

Jandon Mines, Limited.
Prospectus.
Drill logs; 5 holes; 1,841'.
A.W.
Data from O.S.C., P.C.
File SSM-1170.

Township 137

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Cominco, Limited.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1171.

Grand Chibougamau Mines, Limited.
Drill logs; 4 holes; 883'.
A.W.
File SSM-1029.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1118.

Township 138

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Cominco, Limited.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1171.

Township 138, cont'd.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1118.

Township 143

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Cominco, Limited.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1171.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1118.

Rio Tinto Canadian Exploration, Limited.
Drill logs; 6 holes; 3,859'. U_3O_8, ThO_2 assays.
A.W.
File SSM-813.

Stanward Corporation, The.
Drill logs; 5 holes; 601'.
A.W.
File SSM-963.

Township 144

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Green Valley Mines, Limited;
North Rock Explorations, Limited.
Prospectus. U_3O_8, ThO_2, Y_2O_3 assays.
From O.S.C. P.C.
File SSM-1032.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1118.

Township 144, cont'd.

Millbank Minerals, Limited.
Prospectus.
Magnetic, electro-magnetic, scintillometer, and geological surveys.
A.W.
Data from O.S.C.
File SSM-1022.

Norgold Mines, Limited.
P.C.

North Briar Mines, Limited.
Prospectus.
From O.S.C.
File SSM-1075.

North Rock Explorations, Limited.
P.C.

Rio Algom Mines, Limited.
P.C.

Stanrock Uranium Mines, Limited.
P.C.

Township 149

Bloxom, S.
Quarry permit.
File SSM-1079.

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Elliot Lake: The Corporation of the Improvement District of Elliot Lake.
Quarry permit.
File SSM-1055.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W. P.C.
File SSM-1118.

Preston Mines, Limited.
P.C.

Rio Algom Mines, Limited.
P.C.

Township 149, cont'd.

Rio Tinto Canadian Exploration, Limited.
Drill log; 1 hole; 3,214'.
U_3O_8, ThO_2 assays.
A.W. P.C.
File SSM-740.

Silvermaque Mining, Limited.
Drill logs; 10 holes; 25,157'.
U_3O_8, ThO_2 assays.
A.W.
Data donated to O.D.M. P.C.
File SSM-1168.

Stanrock Uranium Mines, Limited.
P.C.

Stanward Corporation, The.
Drill log; 1 hole; 1,440'.
A.W. P.C.
File SSM-720.

Thorncrest Explorations, Limited.
P.C.

Township 150

Canuc Mines, Limited.
Drill log; 1 hole; 141'.
A.W.
File SSM-1150.

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Denison Mines, Limited.
Company annual report. P.C.
File SSM-1040.

Horne, F.M.
Drill logs; 5 holes; 572'.
A.W.
File SSM-681.

Jandon Mines, Limited.
Prospectus.
From O.S.C. P.C.
File SSM-1034.

Township 150, cont'd.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1118.

Multi-Metal Mines, Limited.
(Vista Mines, Limited).
Prospectus.
Magnetic and self-potential surveys.
Drill logs; 2 holes; 1,102'.
A.W.
Data from O.S.C.; P.C.
File SSM-1025.

Rio Algom Mines, Limited.
P.C.

Stanward Corporation, The.
Drill logs; 2 holes; 1,501.6'.
A.W.
File SSM-1078.

Township 151

Brown, L. R., and Company.
Quarry permit.
File SSM-1107.

Sutherland and Associates.
P.C.

Township 155

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W. P.C.
File SSM-1118.

Township 156

Candore Mining and Development Corporation.
P.C.

Township 156, cont'd.

Chandler, L.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1121.

Denison Mines, Limited.
P.C.

Kerr-McGee Corporation.
Airborne magnetic and electro-magnetic surveys.
A.W. P.C.
File SSM-1118.

Township 161

Cominco, Limited.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1172.

Maralgo Mines, Limited.
Drill logs; 4 holes; 2,780'.
A.W.
File SSM-1016.

Texron Exploration, Limited.
Geological report.
From O.S.C.
File SSM-1157.

Township 162

Cominco, Limited.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1172.

Rio Algom Mines, Limited.
Drill log; 1 hole; 2,675'.
A.W.
File SSM-815.

Township 163

Goldray Mines, Limited.
P.C.

Township 163, cont'd.

Jonsmith Mines, Limited.
Drill logs; 11 holes; 2,471'. Cu assays.
A.W. P.C.
File SSM-1137.

Noranda Mines, Limited.
P.C.

Township 167

Candore Mining and Development Corporation.
P.C.

Inspiration, Limited.
Drill log; 1 hole; 1,817'.
A.W.
File SSM-1127.

Township 168

Canamiska Copper Mines, Limited.
Drill logs; 3 holes; 636'. Cu assays.
A.W.
File SSM-634.

Cannon Mines, Limited.
P.C.

Chechak, B. W.
Magnetic survey.
A.W.
File SSM-1067.

Cominco, Limited.
Airborne magnetic and electro-magnetic surveys.
A.W.
File SSM-1172.

Copper Concentrators, Limited.
P.C.

Crownbridge Copper Mines, Limited.
P.C.

Mississagi Syndicate.
P.C.

North Summit Explorations, Limited.
P.C.

Township 169

Canamiska Copper Mines, Limited.
Drill logs; 3 holes; 636'. Cu assays.
A.W.
File SSM-634.

Falconbridge Nickel Mines, Limited.
Drill logs; 2 holes; 2,293'.
A.W.
File SSM-1080.

Goldray Mines, Limited.
P.C.

Triller Explorations, Limited.
Prospectus.
From O.S.C. P.C.
File SSM-1077.

Township 175

Copper Concentrators, Limited.
P.C.

Crownbridge Copper Mines, Limited.
P.C.

Falconbridge Nickel Mines, Limited.
Drill logs; 2 holes; 2,293'.
A.W.
File SSM-1080.

Milgate Mines, Limited.
Geological, geochemical, and self-potential surveys.
A.W.
File SSM-819.

Mississagi Syndicate.
P.C.

Township 176

Falconbridge Nickel Mines, Limited.
Drill logs; 2 holes; 4,672'.
A.W.
File SSM-1081.

Township 188

Beaudin, A.
Stripping, trenching.
A.W.
File SSM-1106.

Jubilant Creek Mines, Limited.
Geological report.
Drill logs; 2 holes; 762'.
A.W.
File SSM-820.

Ontario Hydro.
Quarry permit.
File SSM-1160.

Wade, L.
Stripping, trenching.
A.W.
File SSM-1046.

Plan M.7, Mishibishu Lake Area

Amichi Gold Mines, Limited.
Geological report; Au assays.
From O.S.C.
File SSM-1054.

Plan M.13, Pukaskwa River Area

Acme Gas & Oil Company, Limited.
P.C.

International Bibis Tin Mines, Limited.
Drill logs; 7 holes; 2,238'. Cu, Zn assays.
A.W. P.C.
File SSM-1113.

Plan M.22, McDougall Lake Area

Hollinger Consolidated Gold Mines, Limited.
Geological and magnetic surveys.
Drill logs; 13 holes; 371'. Fe, Au, Cu, Zn assays.
Donated to O.D.M.
File SSM-605.

Plan M.2317, Renesig Creek Area

Algoma Ore Properties Division,
Algoma Steel Corporation, Limited.
Magnetic survey.
Drill logs; 71 holes; 28,324'. Fe assays.
A.W. and data donated to O.D.M.
File SSM-473.

Part 5 (a)

Some Recommendations For Exploration

1. Copper, East Shore of Lake Superior

Middle Keweenawan volcanic and related tectonic activity profoundly affected the Lake Superior basin and its environs. Genetically associated with this activity are the well known copper deposits of Keweenaw Point and Mamainse Point, both of which occur in thick sequences of Middle Keweenawan volcanics and clastic sediments.

Less well known, but evidently equally associated with the Middle Keweenawan volcanic activity, are several copper deposits which occur in Archean host rocks in the Batchawana area, 40 miles north of Sault Ste. Marie. These are of 3 known types:

i. chalcopyrite-pyrite deposits in breccia pipes, which occur in Archean granite and greenstone, typified by the Tribag deposit. Potassium-argon age determinations indicate the breccia is Middle Keweenawan in age.

ii. chalcopyrite-pyrite-molybdenite disseminated in quartz-feldspar porphyry, intrusive into Archean greenstone. The age of the porphyry is uncertain, but is probably Keweenawan. A single occurrence, the property of Jogran Mines, Limited, is known.

iii. native copper in a fracture zone in Archean granite near Mica Bay, Kincaid township. The type of mineralisation and its proximity to similar deposits in nearby Middle Keweenawan volcanics strongly suggest that this deposit is also Middle Keweenawan in age.

These 3 deposits have in common their occurrence in Archean host rocks, and their apparent Middle Keweenawan age.

Although Archean granitic rocks are not generally considered to be favourable host rocks for base-metal mineralization, in the Batchawana area they do constitute the host rocks for the ore-bearing breccia pipe of the Tribag Mine, and for the recently discovered native copper deposit at Mica Bay.

This strongly suggests that the Middle Keweenawan volcanic and tectonic activity of the Lake Superior basin has created within the bordering Archean terrain sites suitable for deposition of Middle Keweenawan copper mineralization.

Thus, as the writer has previously stated[1], the Archean granitic terrain bordering the east shore of Lake Superior merits the attention of prospectors engaged in the search for copper deposits.

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1. Giblin, P. E. 1966. Recent exploration and mining developments in the Batchawana Area of Ontario. Can. Mining Jour., April, 1966, p.80.

2. Molybdenite, Township 24, Range 22

In the course of examining outcrops on Highway 101 between Chapleau and Wawa, a very small occurrence of molybdenite was found in Township 24, Range 22[1]. The occurrence is described in the marginal notes accompanying map P.423.

Although the occurrence is not in itself of economic value, it lies in an area where no mineral occurrences were previously known. Its presence suggests that the area may warrant prospecting for other molybdenite occurrences.

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[1] O on key map.

Part 5 (b)

New Access Roads, Power and Gas Lines

Highway 101 between Chapleau and Wawa was opened to traffic late in 1966. A branch from this highway is being built towards the village of Dalton, with completion expected in mid-summer 1968. When completed, this branch will give road access to Renabie, site of Renabie Mines, Limited.

Also under construction is a highway between White River and Hornepayne. Existing roads extend 5 miles northeast of White River. About 20 miles of new highway has been built south from Hornepayne, and a further 10 miles of right-of-way has been cleared.

Ontario Hydro is constructing a new power line between Marathon and Wawa. The line will be continued southeast to Aubrey Falls on the Mississagi River, where a new generating station is under construction. New access roads connected with this construction activity will facilitate prospecting activities in the vicinity of the power line route.

It is expected that natural gas will become available in Sault Ste. Marie late in 1968. A new pipeline, designed to carry natural gas from western Canada to southwest Ontario, is being built across the intervening portions of the northern United States. A branch from this line will be built to Sault Ste. Marie.

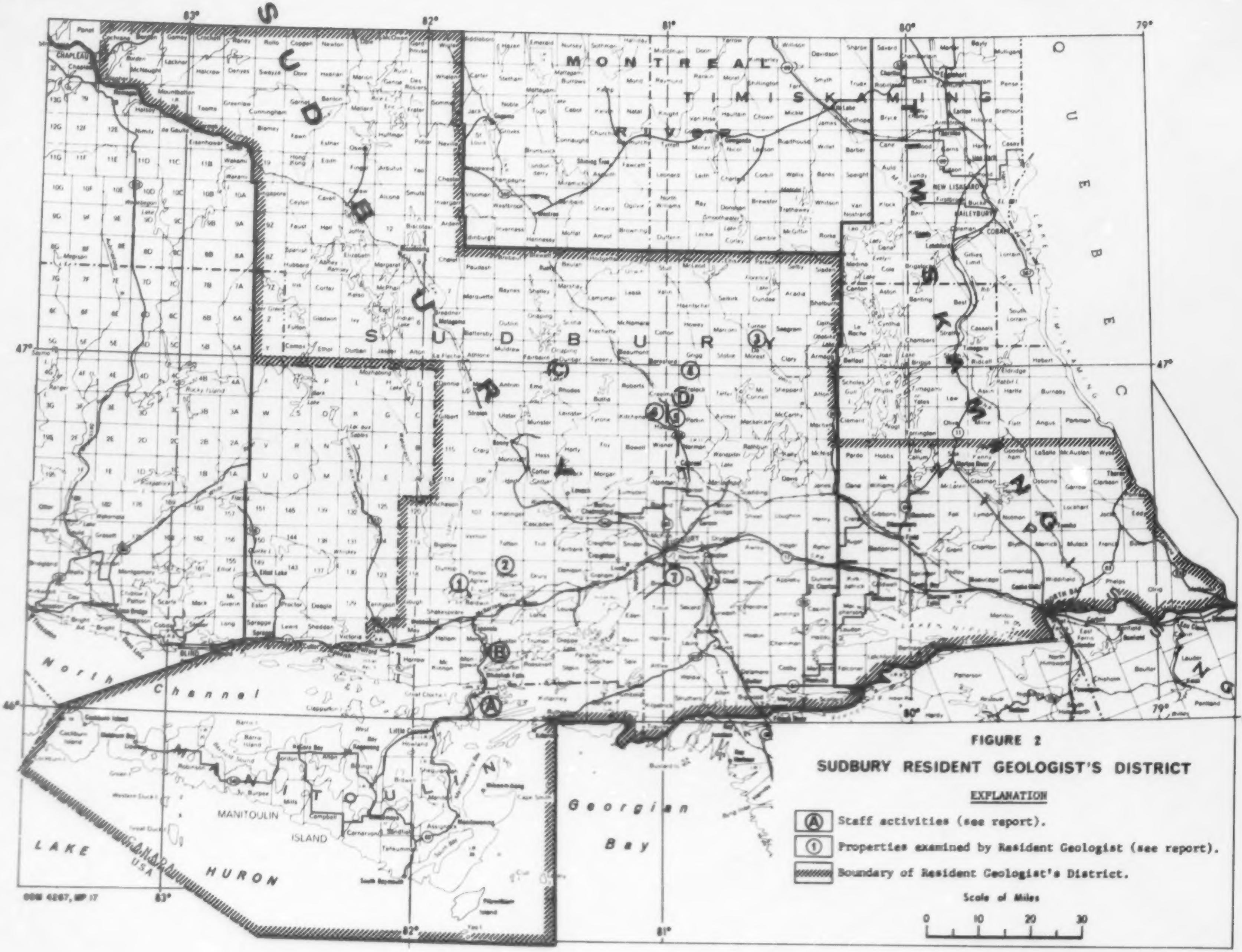
QUEBEC
MONTREAL RIVER
TIMISKAMING
SUDBURY
SUDBURY
NIPISSING
MANITOULIN
MANITOULIN ISLAND
LAKE HURON
North Channel
Georgian Bay
LAKE TIMISKAMING
CANADA
USA
83°
82°
81°
80°
79°
47°
46°
Staff activities (see report).
Properties examined by Resident Geologist (see report).
Boundary of Resident Geologist's District.
Scale of Miles
0
10
20
30
ODM 4267, MP 17

FIGURE 2

SUDBURY RESIDENT GEOLOGIST'S DISTRICT

Sudbury District

by

J.F. Donovan[1]

Staff Activities

The Sudbury Resident Geologist's office is staffed by four employees; resident geologist (Dr. J.F. Donovan), field geologists (Dr. K.D. Card and Mr. H.D. Meyn), and secretary (Mrs. Y.M. Paquette).

The regular duties of the resident geologist were carried out during the past year. These included: the gathering, filing, indexing, and compilation of geological information; the examination of properties being prospected or explored; the presentation and discussion of geological information particularly in regards to prospecting; the conducting of geological tours; the identification of rocks and minerals; and a series of lectures on geological principles given to Lands and Forests Junior Ranger camps in the district. Approximately 108 people made use of the assessment files during the year.

The resident geologist had the opportunity to attend various conferences and field excursions during the year, including: Prospectors and Developers Convention in Toronto;

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[1] Resident Geologist, Temporary address, 1349 La Salle Blvd., Sudbury, Ontario. Manuscript received by The Director, Geological Branch, 11 Jan. 1968.

Annual Meeting of the Canadian Institute of Mining and Metallurgy in Ottawa; Geological Association of Canada conference in Kingston; and the Canadian Institute of Mining and Metallurgy field excursion in Northwestern Quebec and Northern Ontario.

During 1967 field geologists stationed in the Sudbury Resident Geologist office have been active. Dr. K.D. Card conducted a detailed mapping (1" = ¼ mile) project in the MacGregor Bay-Bay of Islands area, and preliminary maps P.440, P.441, P.442, P.443 are published, (A) on Figure 2. This is part of a continuing project to map the Huronian sedimentary rocks along the north shore of Lake Huron. At present Card is writing a final report of the Espanola-Whitefish Falls area; preliminary maps of this area, covering townships Merritt (P.322), Foster (P.390), Mongowin (P.391), and Curtin (P.392), (B) have been published. Dr. Card made a reconnaissance survey of the geology along the shoreline of Lake Onaping, about 40 miles northwest of Sudbury (C). This survey is in conjunction with a study of the water chemistry of Lake Onaping being carried out by Dr. J.R. Kramer, University of Michigan. Card also prepared the Sudbury Mining Area compilation map ODM P.405, acted as field leader and prepared a field guide of the geology of the Sudbury Area for the G.A.C.-M.A.C.-M.S.A.-AZOPRO field excursion, and presented a paper with Mr. D.I. Gillespie, former Sudbury District biologist, Department of Lands and Forests, to the Ontario Conference of Anglers and Hunters in Sudbury, on geology, water chemistry, and wild life management.

Mr. H.D. Meyn continued a detailed mapping program (1" = ¼ mile) of the Huronian belt of sedimentary rocks about 30 miles north of Sudbury. In connection with this project preliminary maps of Hutton (P.399), Parkin (P.400), and Fraleck (P.424), townships (D) have been published; a final report of Hutton and Parkin townships is being prepared as well as preliminary maps of Creelman and Roberts townships. Mr. Meyn acted as a field leader for the G.A.C.-M.A.C.-M.A.S.-AZOPRO field excursion of the Sudbury area during the summer. He also addressed the annual meeting of the French River Resorts Association on the geology of the Sudbury-French River area.

Mining and Exploration Activity

Mining activity was at a high level during 1967 in the Sudbury area. According to Mining Recorder Mr. K.M. Hallock 6,195 claims were recorded by his office. Much of the activity is a direct result of renewed interest in uranium.

Mineral exploration is reflected by the work submitted for assessment credit. During the year credits for 427 claims were received in the Resident Geologist's office, comprising geophysical and geological work and diamond drilling. Two hundred and forty seven holes were drilled in the name of 50 companies or individuals, totalling 137,513 feet.

Major development and exploration projects were carried out by The International Nickel Company of Canada Limited and Falconbridge Nickel Mines Limited (ODM Map P.405). International Nickel Company projects include: developing the Little Stobie mine, one mile north of the Frood-Stobie mine, where two shafts are being sunk, and are scheduled for completion in 1969; sinking the No.9 shaft at Creighton mine, to a proposed depth of 7,150 feet; Copper Cliff North mine scheduled for production in early 1968; Kirkwood mine, No.1 vertical shaft scheduled to produce in 1968; Coleman mine No.1 vertical shaft scheduled for production in 1969; Copper Cliff South mine scheduled for production in 1969. Sinking began in 1967 of an exploration shaft northwest of Garson to determine feasibility of developing large low grade nickel-copper deposits. A deep level exploration program was carried out at the Copper Cliff North, Murray and Garson mines with generally favourable results. International Nickel is engaged in plant improvements to complement its mine expansion program in the Sudbury area. Most notable is the recent completion of the 22,500 ton per day Frood-Stobie mill which will concentrate low-grade ores for pipeline transmission to the Copper Cliff smelter. At the smelter multi-hearth equipment is being replaced with modern fluid bed roasters. A $ 4-5 million expansion of the copper refinery was recently announced, along with a 30 percent increase in capacity of the iron recovery plant, from the present 900,000 long tons of iron ore pellets annually. These projects are scheduled for completion in 1969.

Falconbridge Nickel Mines projects include: preparation for production of Strathcona mine, at the rate of 6,000 tons per day, scheduled for production in early 1968; at the Lockerby and Longvack South mines surface work and collaring of a shaft was completed in 1967; development work continued at the Falconbridge mine at levels between 4700 and 5875, as well as deepening of the No.2 shaft at the East mine to the 5600 horizon. Exploration below the Onaping mine 3050 level found what is thought to be a significant new ore zone; encouraging results were obtained within the area immediately east of the Fecunis Lake orebody. Falconbridge has under consideration construction of a $50 million iron-sulphur plant to use pyrrhotite tailings from the Sudbury operations.

Besides the major nickel producers in the area, the largest development has been at Kerr Addison Mines, Agnew Lake property

Table 1 Metal Production of Sudbury Mining Camp

Period		*1966	*1967	1887-1965
Ore mined	tons	17,892,073	19,659,775	428,635,123
Nickel	lbs.	316,323,358	377,262,250	10,519,151,506
Copper	lbs.	278,722,162	412,480,710	10,227,552,159
Cobalt	lbs.	2,402,779	2,324,680	31,828,879
Selenium	lbs.	111,000	133,300	3,529,510
Tellurium	lbs.	9,000	6,500	227,470
Platinum Metals	oz.	395,952	402,200	10,980,420
Gold	oz.	51,605	51,605	1,947,432
Silver	oz.	1,639,566	1,639,566	60,628,176
Iron Ore	tons	1,497,756	1,497,756	8,004,226
Sulphur	tons	127,138	127,138	1,100,642
TOTAL VALUE	$	456,716,841	619,350,864	7,768,245,811

* Preliminary estimate, subject to revision.

Table 2 Silica Production for Sudbury Mining Area -**1966

	tons	dollars
Falconbridge		
Flux (Sand) (Levack, Falconbridge twps.)	136,061	74,425
International Nickel		
Flux (Lawson)	302,508	215,497
Sand	535,604	117,833
Union Carbide	186,589	493,621
Totals	1,160,762	$ 901,376

** Subject to revision.

Table 3 Industrial Mineral Production Permits, Sudbury Area - 1967.

Sand and Gravel	215,000 cu. yd.
Quartz	7,500 cu. yd.
Granite	10,000 cu. yd.
Feldspar	1,000 cu. yd.

in Hyman township, about 40 miles west of Sudbury. A new company, Agnew Lake Mines, (80% Kerr Addison, 20% Quebec Mattagami Minerals) has been formed to develop the property. A 7-mile access road has been built to the property, from the High Falls road, northeast of Nairn Centre, and collaring of the shaft is underway. It is planned to bring the property into production by 1971, as a 3000-ton a day operation.

A quartzite quarry owned by Union Carbide of Canada on the south shore of Badgeley Point, Killarney township, did not operate during the year.

Industrial Minerals of Canada Ltd. has proven up a deposit of some 10,000,000 tons grading 99.5% silica and 0.02% Fe_2O_3 on Badgeley Island, southwest of Killarney.

Much of the exploration activity outside the Sudbury Basin was in search of uranium. The similarities in the Huronian sedimentary rocks eastward from the Blind River-Elliot Lake area to northeast of Lake Wanapitae have attracted much attention to this belt, and it serves as a prime regional target for uranium exploration.

Within the Basin area the well known association of copper-nickel sulphides with the irruptive rocks is used as a local guide to sulphide mineralization.

New Roads

The new Sudbury-Timmins Highway is under construction and is scheduled for completion in 1970. This highway will give access to large undeveloped parts of the Sudbury District. The recently completed road to the Agnew Lake Mines property in Hyman township, will give access to the country north of Agnew Lake. Recent road construction in the Lake Panache area, west of Sudbury, will open up some of this area.

A recently completed powerline has been built running approximately north-south about 10 miles east of and parallel to the old Sudbury-Timmins powerline. The new powerline service road gives 4-wheel drive access northward to Highway 560.

New Publications

Because of the large concentrations of copper-nickel sulphides in the Sudbury Basin, and the elliptical shape of the Basin, the area is considered to be unique. Dietz (1964) proposed a meteoritic impact origin for the Basin, suggesting the Sudbury structure to be an astrobleme. Further studies by Guy Bray (1966) and French (1967) based on shatter cone and petrographic evidence support a meteorite origin.

Souch (1966) presents evidence to suggest orebodies and sulphide concentrations in the Sudbury Basin are either in or are associated with a discontinuous sub-layer around the outer margin of the norite. Cowan and Lee (1966) describe the Strathcona orebody on the north range of the Basin and suggest field evidence and sulphide-silicate relationships observed at this major deposit contribute to an understanding of the history and origin of the Sudbury ores.

The association of uranium deposits of the Blind River-Elliot Lake area with Huronian sedimentary rocks has been established, and recent work (Ginn 1965; Card 1965, in press) suggest these Huronian sediments can be correlated with Huronian sediments in the Sudbury area. Meyn (in press) reports a belt of Huronian sediments in Hutton-Parkin townships, which are very similar to those along the north shore of Lake Huron. Uranium exploration in the past few years has concentrated in areas of Huronian sedimentary rocks.

Maps and publications relating to the Sudbury District published in the year 1967 include:

Maps

(See list on pages 108-110)

Bay of Islands Sheet (west half), ODM P.440
Bay of Islands Sheet (east half), ODM P.441
Blind River-Elliot Lake Sheet, ODM P.304 (reissued)
Burwash Sheet, ODM P.415
Cartier Sheet, ODM P.287 (reissued)
Chapleau-Foleyet Sheet, ODM 2116
Curtin township, ODM P.392
Foster township, ODM P.390
Fraleck township, ODM P.424
Hutton township, ODM P.399
McGregor Bay Sheet (west half), ODM P.442
McGregor Bay Sheet (east half), ODM P.443
Mongowin township, ODM P.391
North Bay Sheet, ODM P.381
Parkin township, ODM P.400
Sudbury Mining Area, ODM P.405
Westree Sheet, ODM P.300 (reissued)

Papers

(See list on pages 106-108)

Brown (1967)
Card (1967)
Frarey (1967)
French (1967)
Henderson (1967)
Naldrett and Kullerud (1967)
Pye, E.G. (1967)
Wynne-Edwards (1967)

Table 4 Assessment Work Maps and Reports filed at Sudbury Office in 1967

Abbreviations used for Nature of Work

Air	Airborne	GP	Geophysical
DD (1000')	Diamond drilling (total footage)	mag	Magnetic, magnetometer
		R	Radiometric
EM	Electromagnetic	SP	Self potential
GL	Geological		

Assessment work data on file at the Sudbury office for the period June 1, 1965 to Dec. 31, 1966 is given in Miscellaneous Paper 13 of the Ontario Department of Mines.

Company	Township	Nature of Work	No. of claims credited
Acme Gas & Oil Co.	Drury	GP (EM) map 1"=400'; GL map 1"=200'	14
Agnew Lake Mines Ltd.	Hyman	2 DD (2614')	2
Airnorth Mines Ltd.	Cascaden	GP (mag,EM) report, map, 1"=200'; 1 DD (802')	1
Alexander, A.	May	1 DD (413')	1
Assembly Mines Ltd.	Creelman	6 DD (1474')	2
Assembly Mines Ltd.	Roberts	22 DD (6839')	6
Assembly Mines Ltd.	Hutton	16 DD (7324')	4

Atkins, W.F.	Baldwin	4 DD (1655')	1
Azen Mines Ltd.	Crerar	GP (mag) report map 1"=200'	10
Babcock, G.	Salter	GP (mag, EM) 2 maps 1"=100'; production feasibility study	9
Beaverbridge Mines Ltd.	Chester	5 DD (2429') GL map 1"=200'	6
Bebee, T.A. & Chevrier, Germain	McAuslan	3 DD (316')	1
Broulan Reef Mines Ltd.	Baldwin	6 DD (2806')	3
Bruce, M.	May	1 DD (410')	1
Canadian Johns-Manville Ltd.	Baldwin	3 DD (3989')	3
Canadian Nickel Co. Ltd.	Greenlaw	2 DD (410')	2
Canadian Nickel Co. Ltd.	Rollo	3 DD (1733')	3
Canadian Nickel Co. Ltd.	Hess	18 DD (6162')	4
Canadian Nickel Co. Ltd.	Garnet	5 DD (1750')	5
Canadian Nickel Co. Ltd.	Cunningham	2 DD (730')	1
Canadian Nickel Co. Ltd.	Harty	2 DD (645')	1
Canadian Nickel Co. Ltd.	Leinster	2 DD (575')	2
Chester Minerals Ltd.	Chester	5 DD (837')	4
Cons. Shunsby Mines Ltd.	Cunningham	5 DD (1263')	2
Deauville Expl. Ltd.	Nairn	GP (mag, EM,R) report	18

Denison Mines Ltd.	Baldwin	GP (air mag, EM) report, maps 1"=1320'	8
Dennis, W.W.	Rathbun	GP (mag, EM) map 1"=200'	34
Executive Expl. Ltd.	Neelon	GP (mag-EM) report	16
Falconbridge Nickel Mines Ltd.	Falconbridge	4 DD (1422')	2
Grimsell, S.	Drury	6 DD (526')	2
Gutcher, J.	Salter	7 DD (868')	2
Hames, C.M.	Neelon	GP (mag, EM), map 1"=200'; 3 DD (900')	19
Hanover Expl. Ltd.	Porter	GL report	36
Hanson Mines Ltd.	Porter	4 DD (753')	2
Hudson Bay Expl. Ltd.	Creelman-Roberts	6 DD (2050')	3
Humphries, H.C.	Roberts	1 DD (103')	1
International Nickel Co.	Lumsden	9 DD (8700')	8
International Nickel Co.	Norman	1 DD (185')	1
International Nickel Co.	Graham	6 DD (2891')	3
International Nickel Co.	Hanmer	8 DD (10,355')	8
International Nickel Co.	Dowling	8 DD (9566')	6
International Nickel Co.	Fairbank	7 DD (8924')	7
International Nickel Co.	Capreol	7 DD (2456')	4
International Nickel Co.	Maclennan	1 DD (523')	1
Jacka, E.C.	Hyman	1 DD (1261')	1
Kayjon Minerals Ltd.	Davis-Scadding	GP (mag, EM) map 1"=200'	17
Kelly-K Mines Ltd.	Kelly	GP (S.P.) map 1"=200'; 2 DD (1200')	1

Kerr Addison Mines Ltd.	Hyman	11 DD (19,967')	9
Lacelle, W.	Salter	2 DD (99')	1
Landry, C.J.	Hess	GP (EM) map 1"=100'	1
Lang, B.W.	Drury	2 DD (223')	2
MacTavish, R.C.	Hyman	2 DD (2441')	1
Maki, O.	Baldwin	1 DD (305')	1
Mid-North Engineering Services	Baldwin	6 DD (2141')	5
Milner, G.N.	Hyman	5 DD (1084')	1
Mondrow, H.L.	Nairn	GP (mag, EM, R) report and maps 1"=200'	18
National Steel Corp.	Hutton	GP (air mag, EM,R) report and maps 1"=400'	14
National Steel Corp.	Kitchener-Hutton	GP (air mag EM, R) report and maps 1"=400'	14
National Steel Corp.	Hutton-Kitchener	GL report, map 1"=400'	14
Noranda Mines Ltd.	Demorest	1 DD (777')	1
Noranda Mines Ltd.	Clary	1 DD (1001')	1
Noranda Mines Ltd.	Turner	4 DD (2989')	4
Pennebec Mining Corp.	Porter	3 DD (2305')	2
Ronda Copper Mines Ltd.	Nairn	GL report	34
Ronda Copper Mines Ltd.	Nairn	1 DD (1306')	1
Smith, H.E.	Rhodes	4 DD (419')	2
Taylor, S.	Davis-Scadding	2 DD (1150') DD report	3
Texas Gulf Sulphur Co.	Vernon	3 DD (1819')	4
Texas Gulf Sulphur Co.	Foster	2 DD (1518')	3
Walsh, E.	Falconbridge	1 DD (103')	1
Walsh, E.	Dryden	1 DD (107')	1

Property Examinations by Resident Geologist

Uranium Properties, Agnew Lake Area

1.* Broulan Reef Mines Ltd. -- Baldwin township. (1 on Fig.2).
References: Baldwin & Porter townships, ODM Map P.49, 1960
Espanola Sheet, GSC Map 291A, 1938
Espanola Sheet, ODM Map P.105, 1961
Thomson, Jas. E. (1952)
Thomson, Jas. E. (1960)

The company holds three groups of claims in Baldwin township. The author visited the Springer Group, lots 7-8, concession V, where exploration has been active.

The general geology is described by Thomson (1960, p. 29-30):

> "In the north half of lot 7, concession V, amygdaloidal basaltic lava is overlain by a basal conglomerate, followed by a 50-foot band of quartzite, a bed of radioactive quartz-pebble conglomerate, and an upper band of quartzite with local narrow interbeds of radioactive puartz-pebble conglomerate. The formations strike east and dip 45°-70°N. Eastward the formations swing around towards the south.
>
> The basal conglomerate contains an abundance of boulders of the underlying lava. It has an arkosic matrix that has been largely replaced by garnet crystals. Although no angular unconformity is found, this basal conglomerate may be the equivalent of the regolith that occurs at the base of the Huronian system in the Blind River area. The radioactive quartz-pebble conglomerate is also identical in appearance to that which forms the bulk of the ore in the uranium-producing camp. Quartz-pebbles up to 4 inches in length occur in this conglomerate, and disseminated pyrite is found in the matrix. This conglomerate is often quite strongly radioactive when tested with a geiger counter. The sedimentary rocks are similar lithologically to the Mississagi formation of the Blind River camp and occupy the same stratigraphic horizon at the base of the Huronian system. However, in Baldwin township the Mississagi formation is greatly deformed."

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* Number on Figure 2 (p.72).

The property was tested with 27 drill holes by Jellicoe Mines (1939) Ltd. in 1955. Drilling was conducted on a band of radioactive quartzite but no body of commercial importance was outlined and the property was dropped.

Currently Broulan Reef Mines has drilled at least 14 holes totalling 6645 feet in Baldwin township. Early drilling cut a favourable quartz-pebble conglomerate. In addition, two separate beds of radioactive conglomerate has been encountered, with the best results relating to the lower bed, which lies close to a basal conglomerate. Assays are radiometric determinations, and the best intersections obtained to date are 6.2 feet grading 2.1 lbs. U_3O_8 per ton and 8.6 feet grading 2.5 lbs. U_3O_8 per ton. Widespread sections of low radioactivity have been cut. Intersections represent approximate true widths. An airborne survey has been carried out and the EM and radiometric anomalies have outlined a number of drilling targets.

Other companies active in Baldwin township include: Canadian Johns-Manville Company Ltd., Consolidated Montclerg Mines, United Cobalt Mines Ltd., Rowan Consolidated Mines Ltd., and Globe Exploration and Mining Company Ltd.

Canadian Johns-Manville Company Ltd. holds four groups, totalling 65 claims in Baldwin township, half of which are underlain by Huronian rocks. The company has been active in the area, as part of their widespread uranium exploration program in northern Ontario. One hole reaching 2378 feet cut a number of uranium-bearing sections. Two short holes totalling 1063 feet have since been drilled.

Consolidated Montclerg Mines holds a 19-claim group on which limited drilling (4 holes, totalling 1655 feet) was done by Consolidated Montclerg to test radioactive occurrences. Denison Mines Ltd. has taken an option on the property and will probably start drilling before year's end. The property is located immediately west and appears to be up dip from the Canadian Johns-Manville property.

Immediately south of Agnew Lake, Baldwin township, United Cobalt Mines and Rowan Consolidated Mines have carried out radiometric and EM surveys on their properties.

Globe Exploration and Mining Company under agreement with Sheridan Geophysics is examining its property in the Agnew Lake area.

2. Kerr Addison Mines Ltd. -- Hyman township. (2 on Fig. 2).
References: Espanola Sheet, ODM Map P.105 (1961)
Card, K.D. (1965)
Thomson, Jas. E. (1960)

The author visited the camp and surrounding area, lots 5-7, con.VI, about four miles north of Agnew Lake. The property was held by New Thurbois Mines Ltd. until 1956 when Canadian Thorium Corporation Ltd. took it over. The claims were developed by surface work and 36,000 feet of diamond drilling.

Thomson (1960, p.14) states:

> "..... The largest deposit found to date is in Hyman township, and is owned by Canadian Thorium Corporation Limited. The company's engineer has estimated that drilling indicated 750,000 tons averaging 0.095 percent U_3O_8 and 0.30-0.35 percent ThO_2."

In 1961 Kerr Addison Mines Ltd. and Quebec Mattagami Minerals Ltd. obtained the property, and in 1967 formed Agnew Lake Mines Ltd. (Kerr Addison 80%, Quebec Mattagami 20%) to bring the uranium property to production.

Huronian rocks in Hyman township were described by Card (1965, p. 10-11).

> "The lower quartzite formation consists mainly of quartzite but does contain some conglomeratic and pelitic material. The term quartzite is here extended to take in metamorphosed clastic arenites, which contain more that 60 percent quartz, and includes subgreywacke (60-75 percent quartz), protoquartzite (75-90 percent quartz), feldspathic quartzite (10-25 percent feldspar), and arkose (>25 percent feldspar). Orthoquartzite (>95 percent quartz) is rare.
>
> The quartzite is hard and light coloured, the colour varying with the composition. Argillaceous varieties are grey; feldspathic types pink or green; and "pure" varieties white. They are quite feldspathic expecially where they overlie granite, and are sericitic where sheared.
>
> The bedding averages 2-4 feet thick but ranges up to 10 feet. Sorting is poor to moderate; crossbedding of normal and planar types, scour channels, and ripple marks are present.
>
> There are interbeds of pelitic metasediments, polymictic conglomerate, and oligomictic quartz-pebble conglomerate. The metapelite[1] is a fine- to medium-grained, dark green or grey, quartzose rock, which occurs as thin (1-inch to 1-foot) interbeds or partings. These commonly show grain gradation. The polymictic conglomerates are either greenstone-pebble

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[1] Metapelite is here used as a short term for pelitic metasedimentary rocks.

conglomerate, similar to that of the metavolcanic group, or granite-pebble conglomerate. The oligomictic quartz-pebble conglomerate occurs as thin lenses at or near the base of the sequence. It is composed of rounded quartz pebbles in a quartzite matrix and contains uranium and thorium in the form of detrital monazite, uraninite, zircon, and thorianite.

The rocks of the lower quartzite formation are variable along strike. In Hyman township where they unconformably overlie metavolcanic rocks, metapelite and greenstone-pebble conglomerate form the basal sedimentary rocks. Where the quartzites overlie granitic rocks as in Hyman township, coarse arkose and granite-pebble conglomerate are common. To the east, in Drury township where they overlie metavolcanics, the lower quartzites are thinly bedded (3 inches to 2 feet), argillaceous interbeds are abundant, and a thick sequence of metapelite forms the basal sedimentary rocks.

The rocks of this unit have been metamorphosed and thoroughly recrystallized. They are composed of quartz, potash feldspar, plagioclase, white mica, biotite, chlorite, and rarely garnet. Accessory minerals are abundant and include monazite, zircon, magnetite, apatite, and sphene. Shearing has produced schistose or crudely foliated fabrics and stretching and granulation of the constituent minerals.

The thickness of the lower quartzite is quite variable, but is about 400 feet in southwestern Hyman township and 600 feet in Drury township."

Card (1965, p.14) continues:

"The conglomerate formation is quite discontinuous owing to gabbroic intrusion, faulting, folding, and probable discontinuous deposition. Several rock types are present, the most abundant of which is a polymictic conglomerate with a quartzitic matrix termed Ramsay Lake conglomerate by Collins (1936). This rock is massive, and internal structures, including bedding, are rare. It consists of pebbles and boulders of granite, quartz, greenstone, and trap in a medium- to coarse-grained matrix. The matrix, which is characterized by abundant white quartz grains, is composed of angular quartz and feldspar grains with interstitial mica and quartz. The pebble content is up to 60 percent but is commonly only 10-15 percent of the rock volume. The fragments are as large as 5 feet in diameter but average about 6 inches.

Conglomerate of the Ramsay Lake type passes gradationally into polymictic conglomerate with an argillaceous matrix. The pebbles are generally more abundant in the polymictic conglomerate than in that of the Ramsay Lake type. The poorly sorted matrix is fine- to medium-grained and consists of quartz, feldspar, and micas.

There are minor amounts of quartzite and metapelite in this unit, and the conglomerate passes gradationally upwards into metapelites and then quartzites of the overlying unit. This transition zone is about 50 feet thick in Hyman township ....".

Thomson (1960, p.14) described the general character of the uranium and thorium deposits:

"The radioactive quartz-pebble conglomerate is almost always found at, or near, the base of the Mississagi formation, which lies unconformably on a basement complex. An apparent exception to this rule is found in the case of two uranium occurrences in Hyman township, which do not show this exact relationship on company plans, but these deposits are in an area of intense deformation where geological interpretation is difficult. The conglomerate beds are usually concentrated within 100 feet of the basement, but narrow interbeds of the conglomerate may be interbedded with quartzite for hundreds of feet above the main reef. These conglomerates do not extend uniformly across the country at this stratigraphic horizon but rather are concentrated in certain localities. Probably this distribution is related to a deltaic environment in those localities where rivers were entering the Huronian sea. The detailed stratigraphy of the radioactive beds is quite variable, and interlensing of conglomerate, grit, quartzite, and argillite beds may occur; any or all of such beds may contain radioactive minerals in varying amounts.

Quartz-pebble conglomerate is the commonest host rock of uranium and thorium. The conglomerate contains well-rounded to subangular pebbles, mainly of quartz and chert, in a gritty matrix with varying amounts of pyrite. Generally the pebbles range from ¼ to 3 inches in diameter, but occasionally boulders up to 6 inches in diameter may be found. The sorting is good, and pebbles predominate slightly over matrix in percentage of rock volume. On weathered surfaces of the conglomerate, the oxidation of the pyrite in the matrix produces a rusty colour, which contrasts with the white pebbles or adjacent quartzite. In certain areas the conglomerate is strongly sheared, and the ratio of length to thickness of pebbles may be as much as 6:1. In such cases it may be difficult to recognize the rock as a conglomerate in hand

> samples or drill core, but it is readily detected on a good rock exposure.
>
> The width of uranium-bearing beds or reefs varies greatly; these may alternate with relatively barren beds in such a way that only detailed sampling and assaying could indicate thickness of commercial or near-commercial grade. Grades of 0.05-0.10 percent U_3O_8 are generally confined to widths of 5 feet or less, and rarely up to 12 feet, but an average grade of 0.01-0.03 percent U_3O_8 may occur over widths up to 70 feet."

At the time of the author's visit to the property work was concentrated near the contact of an embayment of Huronian sediments in granite. The Huronian sediments strike northeast to east, and are steeply dipping. The granite-sediment contacts are often faulted.

A detailed description of the property is reported by Thomson (1960, p. 23-24) as given to him by a New Thurbois Mines Ltd. company engineer in 1955.

An Interim Report to the Shareholders of Quebec Mattagami Minerals Ltd. dated October 19, 1967 carried the following information:

> "Earlier this year Kerr Addison Mines Limited announced its decision to bring the Agnew Lake uranium property owned 80% by Kerr Addison and 20% by Quebec Mattagami Minerals Limited into production with a target date of January 1st, 1971. Subsequently Agnew Lake Mines Limited was incorporated to which the property was transferred, Quebec Mattagami Minerals Limited receiving 150,000 and Kerr Addison Mines Limited 600,000 of the 750,000 vendor shares issued.
>
> Detailed planning of the initial construction programme has been completed and every effort is being made to achieve production as soon as possible. The seven mile access road has already been constructed and is presently in use. In addition the hoists have been purchased, engineering of the

power line completed, collaring of the shaft is presently underway, the foundation contractor is on the site, the drainage system is virtually completed and all plant and equipment necessary to continue the surface and shaft sinking programme through the winter months is either on the site or will be delivered shortly."

Included in the Interim Report is a summary of a technical and financial study of Agnew Lake Mines Ltd. prepared by David S. Robertson & Associates Ltd., Toronto, dated Oct. 13, 1967. The following excerpts are from that report:

"Four feldspathic quartzite zones carrying radioactive conglomerate are known on the property and it is anticipated that additional zones will be found as drilling is carried out from underground at greater depth. The conglomerates carry economic values in uranium and high values in thorium and rare earths. In general the thorium and rare earth contents of the reefs are significantly higher that that in the reefs at Elliot Lake, where the ore zones are geologically similar but lie more or less horizontal as opposed to the very steeply dipping ore zones on the Agnew Lake Mines Limited property. The average Th/Ur ratio in the ore of Agnew Lake Mines Limited is greater than 2 while at Elliot Lake the ratios are normally about 1. Rare earth content may be as much as five times higher than in the Elliot Lake ores.

Indicated ore reserves are sufficient (if proved as expected by detailed underground drilling) to provide mill feed at the rate of one million tons per year for at least ten years. These reserves have been calculated to a depth dictated by the deepest intersections in each zone.

DRILL INDICATED TONNAGE

	Average Grade U_3O_8 lbs./ton	Average True Width Ore (ft.)	Tons Ore	Pounds U_3O_8
1.8 lbs. plus	2.25	8.7	3,365,000	7,560,000
1.25-1.5 lbs.	1.41	12.0	2,411,000	3,409,000
1.00-1.25 lbs.	1.08	7.8	4,656,000	5,053,000
	1.54	9.2	10,432,000	16,022,000

INFERRED TONNAGE

	Grade (lbs.)	True Width (ft.)	Tons Ore	Pounds U_3O_8
Enclave Ore	2	9	500,000	1,000,000
2 Zone below 800 ft. and above 2400 ft.	1	5	1,000,000	1,000,000

On the basis of what is known about the conglomerates, the higher grade 3 and 5 zones, and possibly other known zones, will continue to greater depths than that to which they have been calculated for inclusion in drill indicated reserves. It is possible that the tonnage on the property may double should 3 zone continue as currently known and should 5 zone develop as expected. Furthermore, each additional new commercial zone will add appreciably to the over all eventual reserves. With data currently available it is not possible to calculate what the character of the ultimate tonnage will be. Over all grade will improve as the heavy influence of the rather low grade 2 zone is reduced by the development of higher grade ore at depth in the better zones.

Our studies of the supply demand relationship in the uranium industry indicate that by 1971 the price of uranium will exceed $9.00 per pound U.S. and may exceed $10.00 per pound U.S. Comments by responsible authorities appear to agree with this and the price on the free U.S. market is now in excess of $7.50 per pound U.S. for 1969 deliveries. During the 1970's the price of uranium is expected to rise beyond these levels. This price rise will be caused in part by an increasing awareness of an ultimate shortage of reserves at less than $10.00 per pound. The more immediate cause, however, will be shortage of productive capacity to deliver at rates required by the growing market.

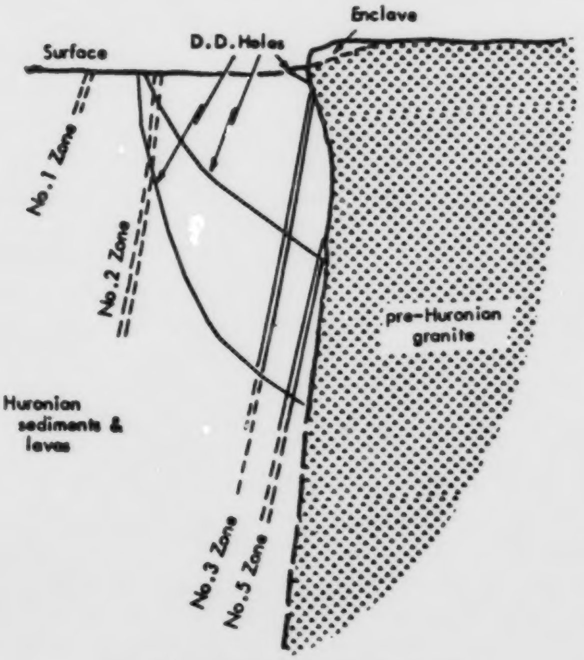
Uranium in the ores largely occurs in minerals that are soluble. Initial leach tests performed on drill core rejects suggests that uranium recovery from the ores will be in the range of 95 percent of the head grades.

The rare earths occur in the ores in the same way as thorium, part goes into solution in the leach and part does not. Further work is required to define how much yttrium can be recovered. Preliminary work suggests that a volume such as to yield a minimum of $1.00 per ton milled may be recoverable.

Costs per ton of ore are expected to be less than those applicable at Elliot Lake for three reasons. First, the fact that the ore is much more steeply dipping than that in the Elliot Lake camp will facilitate mining and reduce costs. Mining methods have not been detailed nor will they be until the underground development proposed is completed. Second, milling has the advantage of all of the Elliot Lake experience to draw upon. There is, for example, time for planning so that there will not exist design errors and waste inherent in the crash programs of the 1950's in the construction of uranium mills. Third, it appears that the ore is less fractious to treat than the Elliot Lake ores."

A sketch of the structure on the ore zone of Agnew Lake Mines Ltd. was also included in the study by David S. Robertson & Associates.

SKETCH of STRUCTURE



David S. Robertson & Associates Ltd.
September 1967

From Quebec Mattagami Minerals Ltd., Annual Report to the Shareholders for the Fiscal Year ended December 31, 1967.

3. Noranda Mines Ltd. -- Turner township (3 on Fig. 2).
References: Maple Mountain Sheet, ODM Map
P.301 (1965)
Collins, W.H. (1917)
Thomson, Jas. E. (1960)

The company holds 37 claims in Turner township. Recently three drill holes totalling 2370 feet were completed. The holes returned nothing of interest and the company is not drilling at present.

The general geology of the area was described by Thomson (1960, p.29):

> "..... The basement rocks, consisting of greatly deformed lavas, pyroclastics, iron formation, granite, and gneiss, are overlain with great unconformity by relatively undeformed sedimentary rocks of the Huronian system. Basic intrusives cut the Huronian and Pre-Huronian rocks.
>
> Quartz-pebble conglomerate lies directly on the basement rocks. It consists of well-rounded, well-sorted pebbles of white quartz, quartzite, greywacke, and rarely, red or green jasper. The pebbles are 1-3 inches in diameter. The conglomerate is interbedded with argillite, quartzite, and greywacke. A variety of the conglomerate is locally called microconglomerate, and consists of beds of small angular quartz pebbles. The conglomerate is exposed at intervals over a length of almost 2 miles, and is approximately 30 feet in thickness. Pyritization is widespread throughout the whole formation but is concentrated in the conglomerate beds. The conglomerate is locally radioactive, with a range of three to ten times background indicated by geiger counter surveys. It is lithologically similar to the ore-bearing conglomerate of the Blind River-Elliot Lake camp and occurs at the stratigraphic horizon of the Mississagi formation. It appears that the Mississagi-like formation is overlain by Gowganda and Lorrain formations, but exact relationships are indefinite because of the scarcity of outcrops. All the Huronian strata are very gently folded, with dips averaging 10-15 degrees to the east or northeast."

Besides Noranda Mines, other companies active in the area include Canadian Johns-Manville, Teck Corporation, and Copperfields Mining Corporation Ltd. Canadian Johns-Manville Company Ltd. has acquired 292 claims in Turner township, based on geophysical and structural information. They have drilled a known quartz-pebble conglomerate with low values. In south-central Turner township Teck Corporation and Copperfields Mining have staked an 18-claim block covering a known quartz-pebble conglomerate. The companies have conducted surface geological mapping and airborne gamma counter surveys.

Uranium Properties North of Capreol

4. Canadian Johns-Manville Company Ltd. -- Fraleck-Grigg townships. (4 on Fig. 2).

References: Capreol Sheet, ODM Map P.367 (1966)
Fraleck township, ODM Map P.424 (1967)
Maple Mountain Sheet, ODM Map P.301 (1965)
Collins, W.H. (1917)

The author visited the company's property in Fraleck and the southern part of Grigg township, immediately east of the Wanapitei River. The property, 583 claims in Fraleck, Grigg and Stobie townships, is being actively explored in northeast Fraleck and southeast Grigg townships, where it is underlain by north-south to northwest trending Huronian metasedimentary rocks.

The metasedimentary rocks are described in the marginal notes of ODM Map P.424:

"These sediments and metasediments are shown to be younger than the previously described basement rocks from evidence obtained in adjacent townships. In Fraleck township the contact between the granitic basement and the sediments is in all cases a fault.

The lowest formation is the Mississagi Formation. In no case is it exposed in its whole thickness and the typical uranium-bearing quartz-pebble conglomerate found near its base is missing in this township. The Mississagi Formation is a medium to coarse-grained impure quartzite. It weathers cream to grey coloured and typically shows a rusty stain caused by abundant finely disseminated pyrite in the rock. Crossbedding is very common.

The contact to the overlying Bruce Formation is conformable and gradational. The Bruce Formation is a conglomerate made up of predominantly grey granite pebbles, cobbles, and boulders in a dark to light grey quartz-rich greywacke matrix. The formation, as much as 2000 feet thick, shows no stratification and structural information is impossible to obtain.

Conformable above the Bruce Formation occurs the Espanola Formation. Only the southernmost location on the map on the east side of the Wanapitei River is definitely outcrop. All the other locations are based on very large loose blocks of the rock typical of the formation. The Espanola Formation in the township is a well bedded limestone showing alternate beds of calcite (marble) and carbonaceous siltstone. The thickness of the calcite beds varies from 1/10 to 1 inch whereas the silty beds are commonly less than 1/10 of an inch thick. The bedding planes are commonly wrinkled in response to tectonic stresses.

The Serpent Formation conformably overlies the Espanola Formation. The Serpent Formation is a medium-grained white quartzite to medium-grained quartz-greywacke. Graded bedding and crossbedding are common. Locally a conglomerate is developed near the base.

The contact with the overlying Gowganda Formation is conformable and gradational where it was observed in the eastern part of the map-area. The Gowganda Formation consists of finely bedded (1/10"-½") grey-greenish weathering argillite mixed with more massive beds of a grey weathering fine-grained greywacke. Conglomerate beds are rare and the clasts are commonly less than 1 inch in maximum dimension. Rafted pebbles are commonly found in the finely bedded argillite. In the upper part of the Gowganda Formation beds of pink arkose 6 to 15 inches thick are included.

The contact with the overlying Lorrain Formation is again conformable and gradational. This was best observed in the rocks just north of Fraleck Lake. The Lorrain Formation occupies large areas of the township in complex structural relationships. It is commonly a grey to greenish weathering medium to coarse-grained quartz-grywacke. Bedding varies in thickness from a few inches for argillaceous beds and crossbeds, to 2 to 6 feet for normal bedding. Beds of quartz pebbles less than 1 inch in their maximum dimension are quite common but pebble beds thicker than 3 inches are rare. Towards the granitic basement rocks in north-central Fraleck township, pink andalusite is developed in the Lorrain Formation."

Faulting is common in Fraleck township as stated in

ODM Map P.424:

"The most prominent structural feature of the map-area is the Wanapitei Fault, so called because the valley of the river of the same name follows the fault zone. This fault zone seems to separate relatively flat-lying and undistrubed Huronian rocks in the east from near vertical, much faulted rocks in the west. Fault patterns in the area are quite complex, and the faults seem to be mostly of the dip-slip type.

The Huronian rocks to the west of the Wanapitei Fault are folded into a vertical, or near vertical, position and only north of Pine Lake do they show any other fold structure. Top determinations from crossbeds and graded bedding indicate tops to the north and northeast. The Huronian sediments to the east of the Wanapitei Fault show dips decreasing from 50 to 20 degrees going eastward. Top determinations show that the sequence is in proper order and position and that these rocks are, therefore, relatively undisturbed."

5. Hudson Bay Exploration and Development Company Ltd. --
Hutton and Creelman townships. (5 on Fig. 2).
References: Capreol Sheet, ODM Map P.367 (1966)
Cartier Sheet, ODM Map P.287 (1965)
Hutton township, ODM Map P.399 (1967)
Collins, W.H. (1917)
Kindle, L.F. (1932)
Lindeman, E. (1914)
Thomson, Jas. E. (1960)

The company holds about 150 claims in Hutton and Creelman townships, optioned from Assembly Mines Ltd. The author visited the camp, lot 1, concession II, Hutton township, as well as the surrounding area. The areas of main interest are underlain by Huronian sedimentary rocks notably the Mississagi Formation found primarily in lots 1-8, concessions III, IV, and V. The Mississagi Formation is described in the marginal notes of ODM Map P.399 as:

> "...... a medium to coarse-grained white quartzite which commonly shows fairly coarse bedding (½ to 3 feet) and coarse crossbedding. Argillaceous beds are common near the base of the formation. It is also near the base where the uranium-bearing pyritiferous oligomictic quartz-pebble conglomerate occurs. The conglomerate is usually made up of a number of individual conglomerate beds separated by argillite, quartzite, or greywacke beds. They vary in total thickness from a few feet to about 100 feet. Pebble content varies from 5 to 80 percent pebbles."

Overlying the Mississagi Formation in Hutton township are the Bruce, Espanola, Serpent and Gowganda formations. These are described on ODM Map P.399 as follows:

> "The contact to the overlying Bruce formation is conformable and gradational. The Bruce formation is largely a conglomerate composed of predominantly grey granite and grey granite gneiss pebbles, cobbles, and boulders in a dark grey-greenish greywacke matrix.
>
> Conformably above the Bruce occurs the Espanola formation which is made up of two members. The lower member consists of a finely bedded (less than one inch) series of alternating limestone and siltstone which gives the rock a ribbed appearance on weathering. Folding and brecciation are common. The upper member is a white to light grey rhythmically bedded siltstone which frequently exhibits soft sedimentary breccias. This member is not exposed in Hutton township.

Conformably above the Espanola formation lies the Serpent formation. This is a medium-grained white to cream quartzite. It is the purest quartzite in the area.

Conformably above the Serpent formation occurs the Gowganda formation. The Gowganda formation has a bed about 20 feet to 100 feet thick of an oligomictic quartz-pebble conglomerate at its base. This conglomerate is non-radioactive, non-uranium bearing. Predominantly the Gowganda formation is composed of a dull grey greenish thinly bedded (fraction of an inch) quartzite. Near the base and throughout the section lenses of white quartzite will occur. Single rafted pebbles may be found but large lenses of conglomerate are very rare in the Gowganda."

Structurally ODM Map P.399 notes:

"The Huronian metasediments have all been folded into a near vertical attitude and have been block-faulted by numerous faults that show no preferred direction."

At least 16 diamond drill holes, totalling 7324 feet have been drilled on the Assembly Mines option in 1967.

In Creelman township, at least 6 diamond drill holes totalling 1474 feet have been drilled by Hudson Bay. One area of interest has been the L. Leslie property, within lots 10-12, concession II-IV. Thomson (1960, p.31) states:

"The radioactive quartz-pebble conglomerate lies directly on the basement granite at three different localities. At other places it is interbedded with quartzite. Narrow interbeds of argillite (locally called greywacke) in the conglomerate are sometimes strongly radioactive. Uraninite has been identified in the bedded argillite and is of detrital origin. Concentration of the uraninite in the argillite may be due to extensive reworking of the detrital material by currents or waves along a shoreline. At any rate, the best uranium mineralization on the property occurs in the bedded argillite between conglomerate beds."

Iron Ore

6. National Steel Corporation of Canada -- Hutton township (6 on Fig. 2).

References:
Capreol Sheet, ODM Map P.367 (1966)
Cartier Sheet, ODM Map P.287 (1965)
Hutton Township, ODM Map P.399 (1967)
Kindle, L.F. (1932)
Lindeman, E. (1914)
Markland, G.D. (1966)

National Steel Corporation (formerly Lowphos Ore Ltd.), operates the Moose Mountain mine in Hutton township, 27 rail miles north of Sudbury. The iron deposits have been known since the 1890's and from 1901-1920 an unsuccessful attempt was made to mine the ores. In 1937 the M.A. Hanna Company became interested in the property and after studies and further exploration brought the property into production in 1959.

The beneficiation plant turns out 625,000 tons of concentrate per year, and the pellet plant, operating since July 1963 produces 600,000 tons of pellets per year. Reserves in 1966 were quoted as 14 million tons. At present 3 shovels and about 10, 27-45-ton trucks are working the pits.

The Moose Mountain mine is located in a belt of Precambrian volcanic rocks. The iron formation in the mine area occurs as eleven main lenticular bodies, which pinch and swell along strike, and are intercalated with basaltic and rhyolitic flows and tuffs. The discontinuous lenses of iron formation strike northwest, dip easterly at 45°-90°, and in places are offset by faulting. The iron formation, which is banded, is composed of magnetite, chert, and amphibole, with an average grade of about 30% iron. Detailed descriptions of the property are found in: Markland, G.D. (1966), and Hutton and Parkin townships by H.D. Meyn, ODM publication in press (Open File Report 5015).

Sulphides

7. Rossi, O.A. -- Broder township (7 on Fig. 2).
References: Broder township, ODM Map P.57 (1959)
Espanola Sheet, ODM Map P.105 (1961)
Sudbury Mining Area ODM Map P.405 (1967)
Grant, J.A. et al (1962)

The property is on the north shore of Raft Lake, lot 1, concession III, Broder township. Three small pits were examined where minor disseminated pyrite, chalcopyrite, and pyrrhotite were found. The host rock is the Nipissing diabase-Sudbury gabbro type, and was described by Grant et al (1962, p.7):

> "The rock is dark-green, medium- to coarse grained, and massive; it is classified as gabbro or diabase depending upon the texture. In an unaltered condition, it consists essentially of plagioclase and augite, but the augite is most often altered to hornblende. All the constituent minerals are generally so altered that the rock might be more properly classified as a metagabbro."

Further --

> ".....Small occurrences of nickel-bearing sulphides have been found at a few places in the gabbro."

Because of the iron staining on the outcrops caused by oxidation of iron sulphides, the property owner considered it significant. However the author found it typical of numerous small isolated occurrences of sulphide mineralization found in the older basic intrusives of the Sudbury area.

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Ontario Dept. Mines

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Volume

3

ONTARIO
DEPARTMENT OF MINES

ANNUAL REPORT
of
RESIDENT GEOLOGISTS' SECTION
GEOLOGICAL BRANCH

1967

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AND MINES
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PART 3

Kirkland Lake and Cobalt Districts by H. L. Lovell

Timmins District by P. T. George

MISCELLANEOUS PAPER 18

MARCH, 1968

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Preface

This annual report for 1967 is the first separate publication covering the work of the Resident Geologists of the Department of Mines for a specific calendar year. In the past the annual "Summary of Field Work by the Geological Branch" had a section devoted to the activities of the Resident Geologists. This is now discontinued. In the future there will be two separate publications, one dealing with the activities of the summer field parties and published late in the calendar year; the other will cover the Resident Geologists' work and be published early in the following year.

This annual report is issued in four parts to cover the Resident Geologists' districts as follows:

Part 1. Kenora and Port Arthur.
Part 2. Sault Ste. Marie and Sudbury.
Part 3. Kirkland Lake, Cobalt, and Timmins.
Part 4. Southern Ontario.

These reports may be issued at separate times and not necessarily in the order listed above. Notices of the releases will be mailed to those on the Department of Mines Notification List.

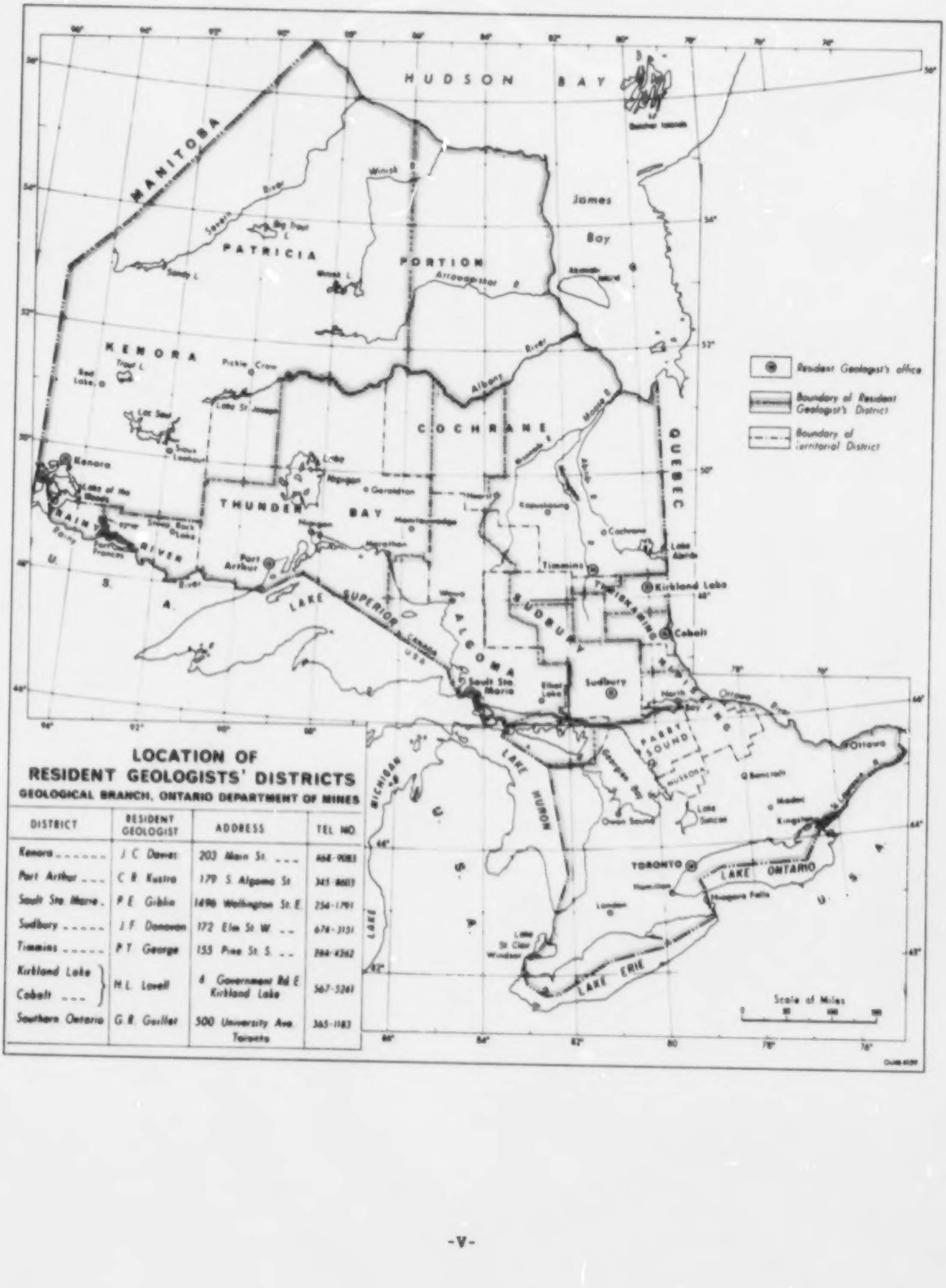
The Resident Geologists are stationed throughout the province to carry on field work and to gather and disseminate information concerning the geology and mineral resources of their districts. At some localities one or more field geologists of the Geological Surveys Section may be permanently

located with the Resident Geologist. In addition to personal observations of the staff, the information collected at the offices includes diamond-drilling records, geological, geophysical, and geochemical maps and reports submitted to the government for assessment work credit, and data on mineral deposits contributed by companies or individuals on a voluntary basis. This information is indexed and kept on open file. Duplicate copies of the assessment work data are also on open file at Room 1323, Mining Lands Branch, Department of Mines, Parliament Buildings, Toronto.

The miscellaneous duties of the Resident Geologists are described in the reports that follow. An index map showing the outline of the resident geologists' districts, and the names, addresses and telephone numbers of the Resident Geologists is shown on the next page.

The objective of this report is to summarize the highlights of the mineral industry in each district during the past year, and also to present any significant new information that may have a bearing on future mineral developments. This could be new discoveries, new geological concepts, new access roads, new maps and literature, the influence of technological advances, new marketing conditions, etc. It is hoped that such data may be useful to those engaged in mineral exploration throughout the province.

J. E. Thomson,
Chief, Resident Geologists' Section.


HUDSON BAY
James Bay
MANITOBA
PATRICIA
PORTION
KENORA
COCHRANE
THUNDER BAY
QUEBEC
ALGOMA
SUDBURY
TIMISKAMING
PARRY SOUND
MUSKOKA
RAINY RIVER
LAKE SUPERIOR
LAKE HURON
LAKE MICHIGAN
LAKE ONTARIO
LAKE ERIE
U.S.A.
Kenora
Port Arthur
Sault Ste Marie
Sudbury
Timmins
Kirkland Lake
Cobalt
TORONTO
Ottawa
Kingston
Cochrane
Geraldton
Hearst
Kapuskasing
North Bay
Owen Sound
London
Windsor
Hamilton
Niagara Falls
Bancroft
Wawa
Elliot Lake
Pickle Crow
Red Lake
Sioux Lookout
Fort Frances
Lake of the Woods
Lake Nipigon
Lake St. Joseph
Lac Seul
Big Trout L.
Sandy L.
Severn River
Winisk R.
Attawapiskat R.
Albany River
Moose R.
Abitibi R.
Ottawa River
St. Lawrence R.
Lake Simcoe
Georgian Bay
Belcher Islands
Akimiski Island
Resident Geologist's office
Boundary of Resident Geologist's District
Boundary of Territorial District
Scale of Miles
0
50
100
150

LOCATION OF RESIDENT GEOLOGISTS' DISTRICTS

GEOLOGICAL BRANCH, ONTARIO DEPARTMENT OF MINES

DISTRICT	RESIDENT GEOLOGIST	ADDRESS	TEL NO
Kenora	J. C. Davies	203 Main St. ...	468-9083
Port Arthur ...	C. R. Kustra	179 S. Algoma St.	345-8003
Sault Ste Marie .	P. E. Giblin	1496 Wellington St. E.	254-1791
Sudbury	J. F. Donovan	172 Elm St. W. ..	674-3131
Timmins	P. T. George	155 Pine St. S. ..	264-4262
Kirkland Lake Cobalt ...	H. L. Lovell	4 Government Rd. E. Kirkland Lake	567-5241
Southern Ontario	G. R. Guillet	500 University Ave. Toronto	365-1183

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by H. L. Lovell

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by P.T. George

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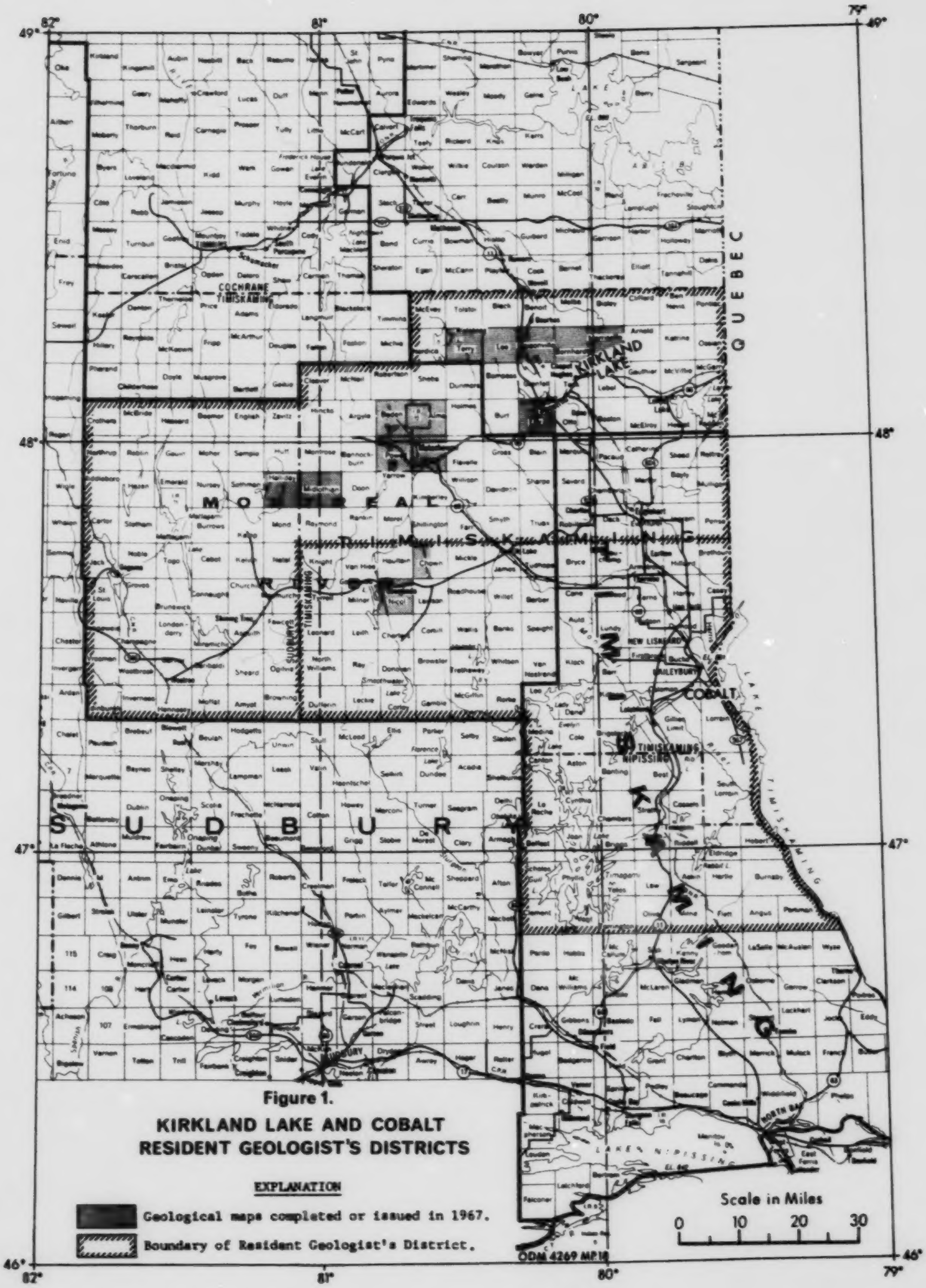
82°
81°
80°
79°
49°
48°
47°
46°
QUEBEC
KIRKLAND LAKE
MONTREAL RIVER
TIMISKAMING
COCHRANE
SUDBURY
NIPISSING
COBALT
NEW LISKEARD
HAILEYBURY
NORTH BAY
LAKE NIPISSING
LAKE TIMISKAMING
EXPLANATION
Geological maps completed or issued in 1967.
Boundary of Resident Geologist's District.
Scale in Miles
0
10
20
30
ODM 4269 MP18

Figure 1.
KIRKLAND LAKE AND COBALT RESIDENT GEOLOGIST'S DISTRICTS

KIRKLAND LAKE AND COBALT DISTRICTS

by

H.L. Lovell[1]

Introduction

The Kirkland Lake and Cobalt areas are served by an extensive system of highways and bush roads, electric power transmission lines, natural gas pipelines, and established communities equipped to serve and staff the mining industry. Fewer claims were staked in 1967 than during 1966, and many claim holdings in arrears for taxes were cancelled, but exploration activity continued at a moderate pace, encouraged partly by the increased area open for staking.

Main Activities of the Resident Geologist

Three townships in the Kirkland Lake area, Eby, Bernhardt, and Morrisette, were mapped. Preliminary maps of these townships and the Bernhardt-Morrisette final report were completed by the writer and assistants. Of 15 townships in the Kirkland Lake-Larder Lake area that are to be re-mapped, 9 are finished. The 6 remaining townships are on the west flank of the economically important Noranda rhyolitic dome.

---

[1] Resident Geologist, 4 Government Road East, Kirkland Lake, Ontario. Manuscript received by The Director, Geological Branch, 23 Jan. 1968.

Following the retirement of Dr. Robert Thomson as resident geologist at Cobalt, the writer was assigned the management of both Kirkland Lake and Cobalt offices. The property files of the Cobalt and Kirkland Lake offices were reorganized, and all information was compiled in summarized form on a transparent overlay of the claims map of each township. The result of this work is a systematic coverage of the amount, distribution, type, and contributor of work done in each township, and rapid retrieval of the desired information from the files is possible, thereby aiding mineral exploration.

Regular duties of the Resident Geologist included gathering and filing mineral exploration information, discussion of exploration projects with prospectors and geologists, conducting university and foreign government geologists and the Canadian Institute of Mining and Metallurgy excursion on tours to points of geological interest in the Kirkland Lake-Larder Lake area, examining properties, revising part of Timmins-Kirkland Lake geological compilation map 2046, and administration of the resident geologists offices and field parties.

Mining and Exploration Activity

Kirkland Lake-Larder Lake area: With the imminent closing of the Teck-Hughes mine, in its 51st year of production, and the cessation of the tailings recovery project by Lake Shore Mines Limited, with a net loss, only one of the former rich gold mines of Kirkland Lake remains in production, - Macassa. Down to the 6,700-foot (deepest) level, Macassa Gold Mines Limited has reported more than 500,000 tons of reserves having an average grade of 0.43 oz. gold per ton, and below the 6,700-foot level, the favourable structure and syenite host rock continue strongly.

The Adams mine of Jones and Laughlin Mining Company Limited broke about 20,000 tons of muck per day, and during 1967 shipped 1,000,000 (long) tons of pellets containing 64 to 65 percent iron.

In the Larder Lake area, gold was produced from Kerr Addison Mines Limited, now the greatest gold producer in Ontario, with the largest gold ore reserve in Canada; from the Upper Canada mine; and from the Upper Beaver copper-gold mine.

Underground exploration on the gold property of Tegren Goldfields Limited west of the Macassa mine continued during 1967, and similar work by Labrador Mining (Ontario) Limited on the Pawnee-Kirkland gold property four miles east of Kirkland Lake ended in the fall, with no plans for production in the near future.

Noranda Mines Limited, Kerr Addison Mines Limited, and Amax Exploration Incorporated conducted property evaluations in the Kirkland Lake-Larder Lake area.

Cobalt area: Complex silver-cobalt-copper-nickel-arsenic ore was produced by Silverfields Mining Corporation Limited, Glen Lake Silver Mines Limited, Hiho Silver Mines Limited (Cleopatra, University, and Kerr Lake properties), Silver Town Mines Limited, Deer Horn Mines Limited, Agnico Mines Limited (Nipissing 407 shaft), Langis Silver and Cobalt Mining Company Limited, and the R.C. McAllister and Chitaroni lessees. In addition, silver was recovered by Agnico from tailings in Cobalt Lake. The smelting and refining was done by the Cobalt refinery, the Noranda smelter, and a Belgian smelter.

Underground work continued on the Genesee and Nipissing North properties of Silver Regent Mines Limited, Silver Summit Mines Limited (a drive from the third level of Silverfields), Sudbury Contact Mines Limited, and Agnico's Nipissing 96 shaft, but was suspended on the properties of Silver Monarch Mines Limited, Millerfields Silver Corporation

Limited, Canadian Keeley Mines Limited, and at the O'Brien, Cart Lake No. 2 shaft, and Nipissing 150 shaft properties of Agnico.

Surface exploration, including soil and stream geochemistry, was carried on by Ragged Chutes Silver Mines Limited and other groups.

A few hundred tons of limestone were shipped from the Farr quarry near Haileybury to smelters and iron works in the area.

Gowganda-Elk Lake area: Silver ore was produced by Siscoe Metals of Ontario Limited from its own property and the adjacent property of Castle-Trethewey Mines Limited, and by Rusty Lake Mining Corporation. After a dormant period, underground exploration was recently resumed on the Rusty Lake property.

Soil geochemistry and other types of surface exploration were carried out by Siscoe and by Zenmac Metal Mines Limited.

In the early part of 1967, copper mining by Spooner Mines and Oils Limited ceased on the Elk Lake area property of Ethel Copper Mines Limited.

Anomalies discovered east of Elk Lake by an E.M. 16 instrument were drilled by Tri-hope Mining and Exploration Limited.

Timagami area: Production of high-grade copper ore by Copperfields Mining Corporation Limited continued, and the shaft was deepened 400 feet to provide two new levels. In addition, Copperfields did considerable surface exploration in areas away from the mine.

During March 1968 the Sherman mine is scheduled to be in full production of iron pellets at a rate of more than 1,000,000 tons per year, for shipment to the Hamilton Ontario plant of Dominion Foundries and Steel Company.

On the old Cuniptau mine property in Strathy township, Ajax Minerals Limited plans to drill a recently-discovered self-potential anomaly, in an attempt to extend its nickel-copper zone.

Matachewan area: The program of geochemical prospecting and diamond drilling by Cominco Limited on the copper-molybdenum property of Pax International Mines Limited was completed during 1967, and the option dropped.

Road improvements were made and barite veins stripped by Extender Minerals of Canada Limited, in preparation for shipping barite to L.V. Lomas Limited, a Rexdale chemical company.

In an area west of Matachewan, Amax Exploration Incorporated did ground follow-up work, including diamond drilling, after an airborne geophysical survey.

In Semple township, asbestos and nickel-bearing gabbros and serpentinites have been or are bein drilled by the following companies: Daniel Mining Company Limited, Probe Mines Limited, and Spirit Lake Mines Limited.

In Sothman township, Falconbridge Nickel Mines Limited is drilling a nickel prospect optioned from Kirkland Minerals Corporation Limited.

Shiningtree area: Mokta Canada Limitée carried out extensive geophysical and geological surveys, followed by diamond drilling in copper-bearing parts of the area of rhyolite lying between Shiningtree and Gowganda.

In the same area, several hundred claims were staked by Timiskaming Nickel Limited, which drilled many holes in nickel-bearing gabbros and serpentinites intruding the rhyolitic rocks.

Raylloyd Mines and Explorations Limited explored in Fawcett, Ogilvie, and MacMurchy townships.

Gogama area: Jonsmith Mines Limited led a staking rush into Stetham and Noble townships in search of uranium. The uranium occurs in syenitic areas of the granitic batholith, near north-striking faults. Jonsmith plans to diamond drill during the early part of 1968.

In addition to the above, limited programs of diamond drilling and geological, geophysical, and geochemical surveying were carried out at many properties in the Kirkland Lake and Cobalt areas. Public records of some of the information derived by the work are listed in the "Property files acquired by the Kirkland Lake office in 1967", to be found elsewhere in this report.

Geological Factors for Consideration in Future Mineral Exploration

The Shiningtree-Matachewan-Kirkland Lake-Larder Lake area is a zone of former volcanism, intrusion, and sedimentation centred on the Round Lake granitic dome, most of which occupies a small part of the large northwest-trending Lake Timiskaming Rift Valley. The best regional map for the area is the Timmins-Kirkland Lake geological compilation map 2046, published by the Ontario Department of Mines.

Geological maps, aeromagnetic maps, and drilling information show an almost continuous zone of dacite to rhyolite tuff, agglomerate, and iron formation (both magnetite-chert and pyrite-pyrrhotite-chert facies) on the flanks of the Round Lake granitic dome. Outward from the granite (from oldest to youngest) the general stratigraphic succession is:

an underlying zone of andesite and basalt, the rhyodacitic zone, and overlying andesite and basalt. The Adams iron mine is in the widest magnetite-chert part of the rhyodacitic zone, and in places the rhyodacitic zone contains appreciable amounts of base metals, copper in pyrite and pyrrhotite, as in the former Dane Copper mine and the former small producers near Boston Creek, and zinc-lead-copper-silver in graphitic tuffs and slates.

Along the northwestern flank of the dome several stocks of alkalic igneous rocks, e.g. the Cairo township (near Matachewan) and Otto township (near Swastika) stocks, intrude the volcanic rocks. Parts of the Cairo stock and its offshoots contain gold (including the former Matachewan gold mines), and anomalous amounts of copper and molybdenum. For years the Otto stock has been known to contain small amounts of uranium, and bornite was recently discovered in mafic alkalic igneous segregations or inclusions. Also, several offshoots east of the Otto stock contain molybdenite.

Two rhyolitic domes occur at the west end of the Round Lake granitic dome, one in the Sothman-Halliday-Midlothian townships area, and the other between Shiningtree and Gowganda. Base metal mineralization in the Sothman-Halliday-Midlothian dome is in the upper (outer) rhyolitic strata.

It consists of: nickel-copper-bearing gabbro and serpentinite intruded into the rhyolitic strata; and lenses of massive graphite-pyrite-marcasite and zones of disseminated pyrite-pyrrhotite-minor chalcopyrite in rhyolitic rocks and interbedded dacite to andesite pyroclastic rocks. Most of the gold is in quartz veins cutting sedimentary (including carbonate) rocks overlying the rhyolitic strata.

The distribution and association of nickel-copper, copper, and gold mineralization in the Shiningtree dome are similar to those in the Halliday dome.

The Kirkland Lake-Larder Lake gold-copper-iron mining area is in sedimentary, volcanic, and intrusive rocks between the Round Lake granitic dome and the Ben Nevis rhyolitic area, which is on the relatively little-explored western flank of the Noranda rhyolitic dome. Between Kirkland Lake and Larder Lake is the McElroy township syenitic stock. On its northeast, southwest, and southeast flanks, and extending farther southeastward into Skead township, is a zone of ultramafic to mafic intrusive rocks, much of which is not readily apparent on existing maps. Asbestos and nickel-copper showings (sulphide blebs and stringers near the contacts of mafic intrusive rocks) are widespread, but the zone has been prospected extensively only for gold. Also in the Kirkland Lake-Larder Lake area, graphitic sedimentary rocks, as well as iron formation, contain zinc-lead-copper-silver showings; appreciable amounts of uranium have recently been discovered in greywacke, conglomerate, and trachyte; and pyrope garnets of the type derived from kimberlite, the host rock of diamonds, have been found.

A series of high aeromagnetic anomalies about 15 miles long is centred in Afton and Scholes townships (west of Lake Timagami). The anomalies are shown on the Lake Timagami aeromagnetic map 1502G (1 inch = 1 mile), issued in 1965. They are caused by iron formation, including relatively high-grade areas of Keewatin-type banded magnetite and chert similar to the ore at the Sherman mine. The iron formation is about twenty miles in a direct line from the Canadian National Railway, electric power, and the natural gas pipeline. Some of the iron formation is overlain by diabase or Huronian sedimentary rocks, so the area should be mapped and drilled to determine the extent of "iron formation" that is exposed or could be exposed economically by removal of overburden or a thin layer of younger rocks.

Maps and Literature published in 1967

Ontario Dept. Mines geological maps of townships (1"=¼ mi.):

- Bernhardt (P.446)
- Chown, west half (P.310)
- Eby (P.448) (early 1968)
- Halliday (P.385)
- Lee (P.389)
- Maisonville (P.409)
- Midlothian (P.386)
- Morrisette (P.447)
- Nicol (P.365)
- Terry (P.365)

Register of Assessment Work, June 1st 1965 - December 31st 1966, prepared by the staff of the Mining Lands Branch, Ontario Dept. Mines, Miscellaneous Paper 13, December 1967.

Summary of Field Work, 1967, by the Geological Branch, (E.G. Pye, ed.), Ontario Dept. Mines, Miscellaneous Paper 11, November, 1967.

Thickness of drift, Lebel, Gauthier, Boston, and McElroy townships, Ontario; by G.D. Hobson and H.A. Lee, Geol. Surv. Canada Map 11-1967.

Geochemical prospecting for silver deposits at Cobalt, Ontario; by R.W. Boyle, Can. Min. Jour., Vol.88, No.4, p.139, 1967.

Guidebook for the C.I.M. Centennial field excursion, northwestern Quebec and northern Ontario, 1967 (general geology and geology of mines in the Kirkland Lake and Cobalt areas).

Paleomagnetism of Precambrian rocks near Cobalt, Ontario, by D.T.A. Symons, Can. Jour. Earth Sciences, Vol.4, No.6, p. 1161-1169.

Geology of Matachewan area, District of Timiskaming, with maps 2109 and 2110; by H.L. Lovell, Ontario Dept. Mines, Geol. Rept. 51, 1967.

Property Files Acquired by the Kirkland Lake Office in 1967

Explanation

AM	airborne magnetometer survey
DH	diamond drillhole(s)
EM	ground electromagnetometer survey
JEM	junior electromagnetometer survey
Mag.	ground magnetometer survey
SP	Self-potential survey

Township	Property owner or optionee	Assessment, development, & exploration work
AMYOT		
East centre	Noranda Exploration Co. Ltd. (also Browning twp.)	Mag.(1"=200') J.E.M. survey (1"=200') with rept. by G.E. Dirom, July 1966.
S.E. part	Quonto Explorations Ltd.	EM (1"=400') with rept. by M.J. Moreau, July 1966.
N.E. part	Wespac Petroleums Ltd.	Mag. & EM (1"=200') with rept. by L.G. Phelan, 1966.
East part	McVittie (PCE option)	DH 66-A-1 to 3.
ANGUS		
West part	Titan Iron Mines Ltd. (also Flett twp.)	AM survey with rept. by F.G. Courage (1"=1320') Mar. 1967 and rept. by W.R.L. Terrance, June 1967.
BANNOCKBURN		
SW part	Fifty-four-thirty-six Incorp.	DH 1,2,3,4,5,7,10,11,14.
BLACK		
N.E. corner	North Expo Mines Ltd.	SP (1"=300') geol. (1"=200') for 2 claims groups, with repts. by G.L. Kirwan, Jan and Mar. 1967.
BOSTON		
S.W. part	Boston Molybdenum Mines Ltd. (also Pacaud twp.)	Geol. rept. by L.J. Cunningham Feb. 1967 (1"=100').
BROWNING		
W. centre	Noranda Exploration Co. Ltd.	See Amyot twp.
BRYCE		
Centre	Decaire, Gerard A.	DH 20-22 profile sections (1"=60').
W. part	Raylloyd Mines and Explorations Ltd. (also Tudhope twp.)	Rept. by E.L. MacVeigh, Aug. 1967.
CAIRO		
East corner	Midrim Mining Co. Ltd. (Webb & Moyneur Lakes area)	DH W-1; W-2; C-1 to 9; Geol. (1"=200')
S.W. part	Midrim Mining Co. Ltd. groups B & A (also Powell twp.)	DH W-3; W-4; C-10; EM & Mag. B group; E. & W sheets (1"=200'); EM (1"=200') Group A with rept. by H.A. Pearson, Mar. 1967.
S.E. corner	North Expo Mines Ltd. (see also Sunisloe)	DH 1; 2; 3; SP (1"=200') with rept. by G.L. Kirwan, 1966.
CONNAUGHT		
N.E. corner	Monarch Gold Mines Ltd.	Mag. & EM (1"=200') with rept. by T. Gledhill, 1965.
N.E. corner	Murky Fault Metal Mines Ltd.	Mag. EM & SP (1"=200') & rept. by J.L. Tindale, 1967.
FAWCETT		
S.E. part	Raylloyd Mines & Explorations Ltd. (see also Ogilvie Synd.)	Dip needle sur.; EM 16 (1"=200'); 2 vert. EM (1"=200'); 2 tot. intensity Mag. (1"=200') with repts. by J.W. Willars 1967.

Township	Property owner or optionee	Assessment, development, & exploration work
FLETT		
W. part	Titan Iron Mines Ltd.	See Angus twp.
GAUTHIER		
N. centre	Taylor, Thos. C.	DH (1966) M-2.
N. centre	Upper Canada Mines Ltd. (Taylor, Thos. C.)	EM (1"=200'); Turam (1"=200') and rept. by M.J. Moreau, 1967.
N.E. part	International Mines Services	Vert. & Hor. EM & Mag. (1"=200') & rept. by Geo. W. Sander, 1967.
N.E. part	Lake Beaverhouse Mines Ltd. (pt. of Harris claims) (also McVittie twp.)	DH 67-1; 67-2.
HALLIDAY		
N. central	Amax Exploration Incorp. (Majory; Pat; & Adele groups) (also Hutt twp.)	DH KX14; KX17; KX20; KX1-66.
HUTT		
	Amax Exploration Incorp.	See Halliday twp.
INGRAM		
N½ SE½	Marshall, James R. (Martin; Fox L. Mines; Hamason Mines, Ltd.)	DH 1-E; 2-E; 3-E.
KELVIN		
	Timiskaming Nickel Ltd.	DH K-1; K-2.
KNIGHT		
S.W. part	Sutherland, Wm. Don (also Natal, MacMurchy & Tyrrell twps.)	DH A-7 to 20; A-22; C-1 to 8; C-3A; 1; 2; M-4; E-4; B-1; B-2.
	Arthur Lake Mines Ltd. (see Sutherland Arthur L. prop.) (also Natal twp.)	DH A-14 to 20; A-22
MAISONVILLE		
Con. IV, lots 4,5	Kerr Addison Mines Ltd.	DH 67-1; 67-2.
Con. I,III, pts. of lots 1, 2, 3.	Aubin, Alphonse (Hollinger option)	Geol. surv. (1"=100'); Mag. (1"=200') with repts. by C.D. MacKenzie & W.H. Hanson 1966; DH S-1; M-1.
Con. I,III, pts. of lots 1, 2, 3.	Hollinger Consolidated Gold Mines Ltd. (Aubin)	DH M-2.
MONTROSE		
	Amax Exploration Incorp.	DH KX14; KX17; KX20; KX1-66.
MULLIGAN		
	Marshall, James R.	See Ingram twp.
McELROY		
N.W. part	Erickson Properties	Seismic & Mag.; bedrock profiles (1"=100') (vert.) & (1"=200') (Hor.); repts. by P.E. Walcott, 1966.
McGARRY		
	Campbell, D.	DH C-1.

Township	Property owner or optionee	Assessment, Development, & exploration work
MacMURCHY		
	Midrim Mining Co. Ltd.	See Fawcett twp.
	Raylloyd Mines & Explorations Ltd.	Rept. by J.G. Willars, 1967.
N.E.corner	Timiskaming Nickel Ltd. (Sutherland, Wm. Don)	DH M-5.
McNEIL		
S.E. part	Denison Mines Ltd. (also Robertson twp.)	Mag; geol. (1"=200') with rept. by C. Kuryliw 1966.
McVITTIE		
	Lake Beaverhouse Mines Ltd.	See Gauthier twp.
NATAL		
	Sutherland, Wm. Don	See Knight twp.
N.E. corner	Sutherland, Wm. Don (Pigeon L. group - N. group)	DH T-1 to T-6.
N.E. corner	Timiskaming Nickel Ltd.	DH N-1; N-2.
	Arthur Lake Mines Ltd.	See Knight twp.
OSSIAN		
	Barbi Lake Copper Mines Ltd.	DH 61-1.
OGILVIE		
	Raylloyd Mines & Explorations Ltd.	See Fawcett twp.
	Ogilvie Syndicate, The (also Fawcett twp.)	DH 1 to 5; geophysical extension claims with rept. by J.B. Boniwell, 1967.
PACAUD		
	Boston Molybdenum Mines Ltd.	See Boston twp.
PENSE		
	Verrier, Emile	DH 1-5.
POWELL		
S. central	British Matachewan Gold Mines Ltd.	DH 5-66.
S. corner	Midrim Mining Co. Ltd. (Groups B & A)	See Cairo twp.
S.E. part	Plaunt-Cummings	Examination rept. by J. Baker, 1967.
ROBERTSON		
S.W. part	Denison Mines Ltd.	See McNeil twp.
S. central	Daniel Mining Co. Ltd.	Rept. by R.J. Bradshaw, 1967 Geol. (1"=½ mi.)
S.E. part	Draper, Roy J. (see also PCE; Dominion Gulf)	DH 67-1.
N.E.½	PCE Explorations Ltd.	EM (1"=200') with rept. by K. O'Connor, 1967.
STRATHCONA		
	Copperfields Mining Corp. Ltd.	DH C-6; C-7.
	Cliffs of Canada Ltd., Sherman Mine	Geol. (1"=100') with rept. by J. Poloni, 1967
TUDHOPE		
	Raylloyd Mines & Explorations Ltd.	See Bryce.
TYRRELL		
N.W. corner	Sutherland, Wm. Don	See Knight.
YARROW		
N.E. corner	Legacy Mines Ltd.	Geol. (1"=200') with rept. by Robt. E. Aiken, 1967.

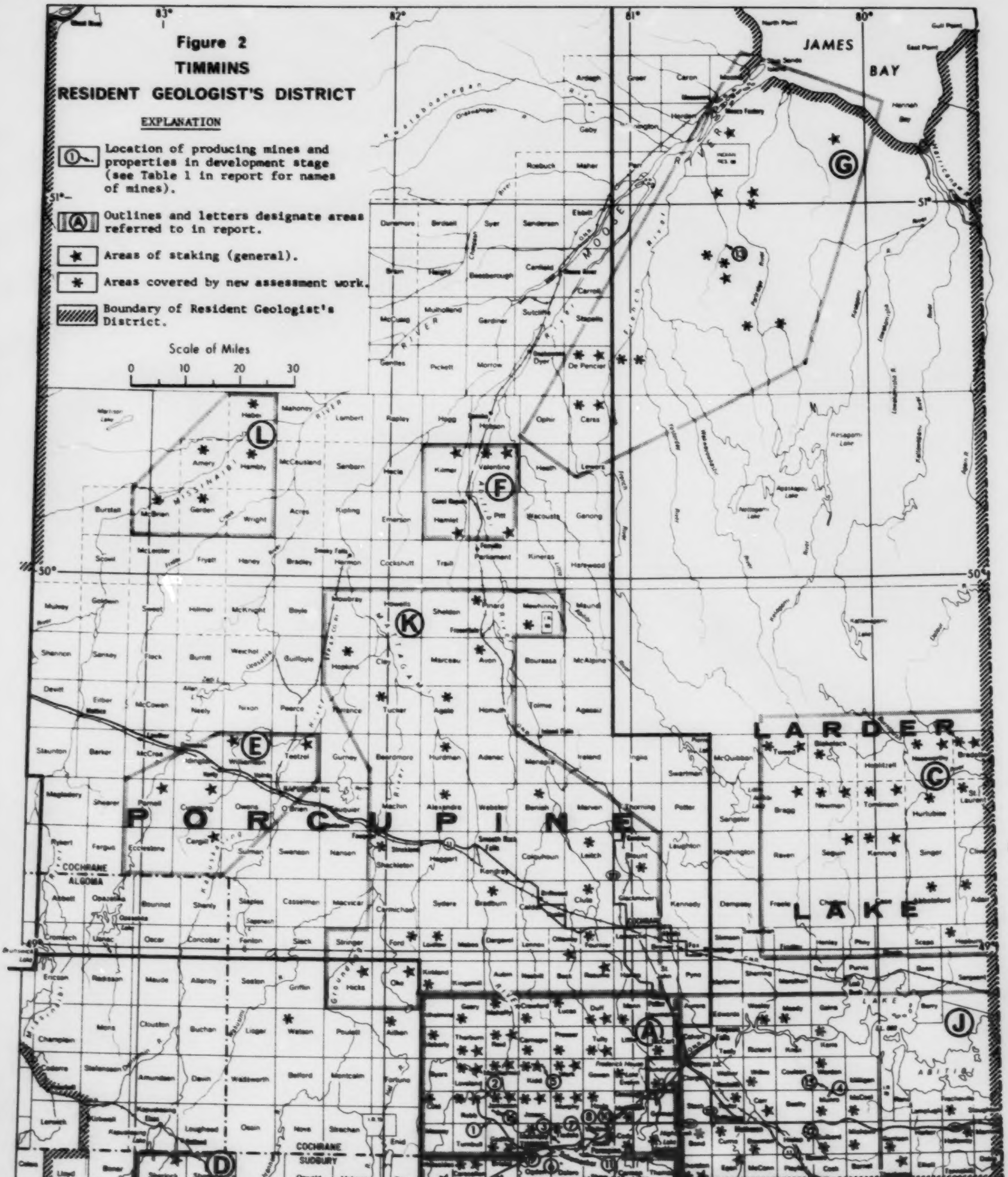

Figure 2

TIMMINS

RESIDENT GEOLOGIST'S DISTRICT

EXPLANATION
Location of producing mines and properties in development stage (see Table 1 in report for names of mines).
Outlines and letters designate areas referred to in report.
Areas of staking (general).
Areas covered by new assessment work.
Boundary of Resident Geologist's District.
Scale of Miles
0
10
20
30
83°
82°
81°
80°
51°
50°
49°
JAMES
BAY
MOOSE
RIVER
MISSINAIBI
KATTAGAMI
PORCUPINE
LARDER
LAKE
QUEBEC
COCHRANE
ALGOMA
COCHRANE
SUDBURY
ABITIBI
A
B
C
D
E
F
G
H
J
K
L
1
2
3
4
5
7
8
9
10
11
13
ODM 4563, MP10

Timmins District

by

P. T. George

The author took over as Resident Geologist in Timmins on May 1, 1967. Mr. E.J. Leahy was appointed as assistant at that time. Much of the author's activity during 1967 pertained to familiarization with the area and with the office routine. Compilation of assessment file data on quarter-mile township maps is continuing in particular for the area immediately north of Timmins. Visitors were shown typical features of Porcupine geology on a number of occasions and in addition approximately seventy-five geologists visited the area in October under the auspices of the Canadian Institute of Mining and Metallurgy. The author was active in the preparations for this trip in addition to assisting in the editing of the C.I.M.M. Guidebook for the Val d'Or to Cobalt tour.

E.J. Leahy completed detailed mapping in the Nighthawk Lake area (Cody, Macklem, Carman and Thomas townships) and worked on compilation projects in other parts of the Timmins area.

Property examinations were confined completely to the logging of drill core with the exception of visits to a number of the producing mines in the area.

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[1] Resident Geologist, 155 Pine Street South, Timmins, Ontario. Manuscript received by The Director, Geological Branch, 19 Jan. 1968.

Mineral Production And Development

Table 1 summarizes the estimated mineral production for the Timmins area during 1967. The locations of the mines are approximately indicated in Figure 1 using the numbers presented in Table 1. The most significant feature of the mineral production for the area is the effect of a full year's production from Texas Gulf Sulphur Co. Inc.'s Ecstall Mine in Kidd township. The mine is the world's largest producer of silver and zinc. Considering silver, 98 percent of Ontario production, 30 percent of Canadian production and 4 percent of Free World production came from the Timmins area in 1967 and the majority of the Timmins production (98.8%) came from Texas Gulf. Similarly with zinc, 30 percent of Ontario production, 26 percent of Canadian production, and 7 percent of Free World production came from the base metal mines of the Timmins area, with 96 percent of this production from Texas Gulf. The Timmins area also produces 45 percent of Ontario's gold and 16 percent of Ontario's copper.

No gold mines opened or closed during 1967, however Hollinger Consolidated Gold Mines Ltd. announced that the Hollinger Mine would close early in 1968 after fifty-eight years of production.

Late in 1966 power line construction was completed to the property of Munro Copper Mines Ltd. in Munro township

Table I

Estimated 1967 Production
Of Timmins Resident Geologist's District*
(Tons And Average Grade)

Company	Tons Milled	Gold oz/ton	Silver oz/ton	Copper percent	Zinc percent
Base Metals					
**1 Canadian Jamieson	133,470			2.44	3.42
2 Kam-Kotia Mines	679,000			1.36	1.77
3 McIntyre Porcupine	730,000			0.9	
4 Munro Copper	105,000			1.8	
5 Texas Gulf Sulphur	3,285,000		3.	1.6***	8.3***
Precious Metals					
6 Aunor	238,000	0.31	0.02		
7 Dome	714,000	0.25	0.06		
8 Hallnor	131,000	0.38	0.02		
9 Hollinger	533,000	0.25	0.04		
3 McIntyre Porcupine	330,000	0.03	0.30		
10 Pamour	605,000	0.10	0.01		
11 Preston	154,000	0.52	0.04		
12 Ross	142,000	0.13	0.21		
Under Development					
13 Consolidated Morrison	Columbium				
14 Canadian Johns-Manville	Asbestos				
15 Hedman Mines	Asbestos				
16 Jameland Mines	Copper				

Estimated Mineral Productivity Relative To Ontario, Canada, And The Free World, 1967*

	Timmins Area	Ontario	Canada	Free World
Gold (oz)	646,150	1,438,000	3,000,000	41,700,000
Silver (oz)	9,867,100	10,065,000	32,500,000	230,000,000
Copper (tons)	73,355	516,750	560,000	6,000,000
Zinc (tons)	285,360	944,725	1,100,000	4,080,000

*Sources of Information: Mining Annual Review, 1967; Northern Miner, 1967; Ontario Department of Mines Annual Review, 1966; Ontario Department of Mines Gold Bulletins, 1967; Personal communications with the mining companies, 1967.

**Location numbers on Fig. 2.

*** Figures based on Northern Miner data, April 6, 1967.

(Area J, No. 4, Figure 2) and by early January 1967 the final installation of milling equipment was completed. Underground development of stoping areas on the second, third and fourth levels continued throughout 1967 and the shaft was deepened from 600 to 900 feet below the surface thereby opening up two more potential working levels. Milling commenced in late February and by May 300 tons per day of ore were being milled, increasing to 500 to 600 tons per day from mid-July to December. An estimated 105,000 tons of ore containing approximately 1.8 percent copper were milled. Estimated ore reserves are reported by the company as follows: 400,000 tons containing 2.09 percent copper and 1.69 percent zinc, and 200,000 tons containing 1.98 percent copper and 1.63 percent zinc. Copper recovery is approximately 90 percent and zinc is not being recovered at the present time.

Development of an open-pit deposit containing a probable 10 million tons of short fibre, chrysotile asbestos ore averaging 50 percent asbestos is planned by Hedman Mines Ltd. in Warden township (Area J, No. 15, Figure 2) following the finalization in May 1967 of arrangements for financial backing by Gulf Western Industries Limited. Production is planned for 1968.

Canadian Johns-Manville Ltd. are finalizing development work on their Reeves township (Area H, No. 14, Figure 2) asbestos deposit with production scheduled to start early in

1968. Some three and a half million tons of waste and fifty thousand tons of overburden have been removed in preparing the open pit for mining operations.

During 1967 Highway 576 from Timmins to Kamiskotia was paved following complete reconstruction and re-routing. This road provides access to the properties of Canadian Jamieson Mines Ltd., Kam-Kotia Mines Ltd. and Jameland Mines Ltd. which is under development. A new transmission line was constructed into the Kam-Kotia Mine during 1967.

The first intersection of ore grade mineralization was made late in 1966 at the Jameland Mines Ltd. property in Jamieson township. Two to three diamond drill units were working throughout 1967 and a total of 69 holes were sunk consisting of approximately 50,680 feet of exploration drilling and 1250 feet for shaft site development. By September the company reported that 445,000 tons of ore grading 1.95 percent copper had been outlined. Preparations are in progress for the sinking of a 1200-foot four-compartment shaft.

During 1967 up to 5 drills were in operation on the property of Consolidated Morrison Ltd. in the James Bay Lowland Area (Area G, No. 13, Figure 2). An open-pit deposit of pyrochlore-bearing carbonatite is visualized by the company containing 80,000 tons per vertical foot with an average grade of 0.52 percent columbium pentoxide. Preparations for the sinking of an exploratory shaft for the purpose of obtaining a bulk sample are in progress. The author will be visiting the property early in 1968.

Staking

The major areas of staking are indicated in Figure 2 (See Legend). The majority of the new staking was in the immediate Timmins area (Areas A, B and J, Figure 2) and involved both the restaking of ground which has come open since the major staking rush in 1964 following the discovery of the Texas Gulf Sulphur orebody, and new staking.

Following rumors of a base metal discovery in the Burntbush River Area (Area C, Figure 2) in late 1966 considerable ground was staked in an eight township area. None of the data filed for assessment purposes have contained reference to any mineralization of economic significance.

Staking in the Shenango-Sherlock township area (Area D, Figure 2) was in the vicinity of an inferred alkalic rock-carbonatite complex. No information is available at present regarding exploration work in the area.

Interest in carbonatite occurrences in the Parnell-Teetzel township area (Area E, Figure 2) probably accounts for some of the staking in that vicinity.

Following the announcement in March (Brown et al 1967) that kimberlite had been discovered in the Coral Rapids Area

(Area F, Figure 2), during reconnaissance mapping by the Ontario Department of Mines, considerable staking took place in a four township area. Some work was undertaken during 1967 but no results have been made public to date. Other staking in the area involved areas of circular magnetic features of possible carbonatite origin.

A number of companies have been active in the James Bay Lowlands Area (Area G, Figure 2). See "Exploration" for additional information.

Exploration

The only new discovery in the Timmins area as a result of exploration in 1967 or late in 1966 was the base metal orebody on the property of Jameland Mines in Jamieson township (See "Development Work").

Considerable work has been done by various companies during 1967 and for ease of presentation the Timmins area has been divided up into a number of sub-areas (See Figure 2). In the following discussion, it should be noted that the new work filed with the Timmins office (Appendix 1) was not all undertaken during 1967. Some of the work filed early in 1967 was completed during 1966.

The tables of new information presented with the description of each area are to be used in conjunction with Appendix 1.

North Timmins Area (Area A, Figure 2)

The following companies were active during 1967 in the townships indicated in brackets but have not filed any information with the Department during 1967: Augdome (Tisdale), Canadian Jamieson (Godfrey-Jamieson, see "Producing Mines"), Cominco (Jessop), Consolidated Morrison (Whitney), Gulf Lead (Wark), MacDonald Mines (Loveland), Mogar Mines (Turnbull, Massey), Victoria Algoma (Whitney), and Windfall Mines and Oils (Prosser).

Table 2 shows the companies that have submitted new data on the townships indicated during the month indicated (See Appendix 1 for details of the work done).

The information filed is currently being compiled in the Timmins office on one inch equals one quarter mile township base maps. Maps with sufficient new information will be issued at that scale whereas the remainder will be used for one inch to two mile compilation sheets.

Much of the data filed are follow-up geophysical surveys and diamond drill programs subsequent to airborne geophysical surveys.

No mineralization of economic significance has been reported other than the Jameland Mines ore zone.

Table 2

North Timmins Area
(Area A, Figure 2)

Company	Township	Month
Allerston, R., Prop.	Godfrey	June
Asarco (Loveland Syndicate opt.)	Macdiarmid	Sept.
Bruce Presto	Macdiarmid	May
Canadian Lencourt	Robb, Jamieson	Aug.
	Whitney	Sept.
Carnkidd	Carnegie	May, Sept.
Chance Mining & Expln.	Crawford	Jan.
	Kidd	May
	Lucas	Mar.
	Mahaffy	Feb.
	Reid	Feb., Mar.
	Wark	May
Cincinnati-Porcupine	Mahaffy	Feb.
	Robb	July, Aug. Nov.
Conduc	Kidd	June
	Wark	Feb., Aug.
Crackingstone Mines	Murphy	Nov.
Denison	Geary	Mar.
Garstock Group	Tisdale	May
Gaspe Park	Macklem	June, Oct.
Glencona	Murphy	Feb., Mar.
Hill, L. E., Prop.	Cody	Aug.
Hollinger	Carscallen	Nov.
	Dundonald	Mar.
	Evelyn	Sept., Oct.
	Jamieson	July
	Jessop	April
	Loveland	Oct.
	Mountjoy	June
	Reid	April, Nov.
	Wark	Feb., June
Inco	Duff	June
	Hoyle	Jan.
	Lucas	June
	Reid	May
	Thorburn	Mar.
	Tully	April
Jameland	Robb, Jamieson	Oct.
Jamieson Copper	Jamieson	Feb., May, Aug., Dec.
Jessop Mines	Jessop	April

Table 2
(continued)

Company	Township	Month
Kam-Kotia Mines	Janieson	Feb.
Kayjon	Robb	June
Keevil	Carnegie	Feb., Sept.
	Crawford	April
	Hoyle	May
	Kidd	Feb., Sept.
	Mahaffy	Mar., April, May, Aug.
	Matheson	May
	Tully	Aug., Sept.
Kenilworth	Prosser	Jan.
Mespi	Bristol	June
	Carscallen	Aug., Oct.
	Godfrey	Feb.
	Jamieson	Feb., Sept.
	Loveland	Oct., Dec.
	Moberly	Feb.
	Reid	Jan., Feb., April, May, July, Aug. Oct.
	Thorburn	Jan., Feb., April, May, July, Oct.
	Tully	Sept.
New Harricana	Cote	Sept.
Nisto-Jelex	Carnegie	Feb.
	Reid	July
North Rankin	Moberly	June
	Thorburn	June
Ourgold	Jessop	Feb., Sept. Dec.
Quebec Cobalt & Expln.	Mann	Oct.
S. S. Szetu	Wark	Feb.
Texas Gulf Sulphur	Hoyle	Dec.
	Kidd	Nov.
	Prosser	Feb.
	Wark	Feb.
Texmont	Jessop	Oct.
	Prosser	Oct.
Victoria Algoma	Murphy	Nov.
White Star	Jessop	May, Sept.

South Timmins Area (Area B, Figure 2)

Exploration for nickel deposits in the ultrabasic rocks of the South Timmins Area continued throughout 1967. In addition a number of base metal and precious metal prospects were assessed.

Texmont (Bartlett and Geikie), Rowan Consolidated (Douglas), Ganda Silver Mines (Adams), and Kennco (Whitesides) were active in the area but did not file any new information with the Department.

Table 3 summarizes the companies, the townships, and the months of filing of new assessment work for the South Timmins area.

A feasibility study is underway on the Texmont nickel occurrence in Bartlett and Geikie townships. Further work will depend on the results of this study.

No new information has been obtained regarding the magnesite occurrence in the south part of Deloro township held by Canadian Magnesite.

In Whitesides township the discovery of an interesting copper-nickel prospect in gabbro near a gabbro-mafic volcanic contact was made by W. Dalaire, a local prospector. The ground was optioned to Kennco: geological and geophysical surveys, and stripping were undertaken but the results have not been made public.

Table 3

South Timmins Area
(Area B, Figure 2)

Company	Township	Month
Acme Oil and Gas	Douglas	Feb.
	Eldorado	Feb.
	Langmuir	Feb.
	McArthur	May
	Price	Aug.
Chance Mining	Eldorado	Aug.
Clarke, T. R., Prop.	Adams	Sept.
Con-Shawkey Mines	Langmuir	Feb.
Dillon Prop.	Shaw	Mar.
Fox Lake Mines	Eldorado	Feb.
Galata, E., Prop.	Eldorado	Sept.
	Langmuir	Sept.
Gomar	Langmuir	Oct.
Hollinger	Denton	Feb., Oct.
	Thorneloe	Oct.
International Kenville	Fallon	June
	Langmuir	June
Jarvi Option	Sheraton	Oct.
Lakehead Mines	Douglas	May, Oct.
	McArthur	May, Oct.
Lake Kozak Mines	Langmuir	Jan.
Larche-Rousseau Prop.	Fripp	June
Larchmont	Langmuir	March
McWatters	Carman	June
	Langmuir	Aug.
Mespi	Carman	May, Aug.
	Langmuir	May
Michie, T., Prop.	Adams	Sept.
Mining Corp.	Eldorado	May
	Langmuir	June
Noranda	Carman	Aug.
Northwest Canalask	Langmuir	Mar.
Ourgold	Langmuir	Feb.
P. C. E.	Langmuir	May
Pezzolato Prop.	Fripp	Jan.
Pyrotex	Eldorado	Sept. Oct.
Silver Ore Zones	Bartlett	Feb.
Silverplace	Eldorado	Feb.
	Langmuir	Jan.
United Buffadison	Fasken	May, June

Burntbush River Area (Area C, Figure 2)

Following rumors of a base metal find by a major company, considerable staking occurred in the north part of the Burntbush area in late 1966.

Force Crag Mines (Bragg), Movado Mines (Tweed), and United Macfie Mines (Newman) were active in the area but have not filed any information with the Department.

Companies holding ground in the area that have filed assessment work are indicated in Table 4.

No reports of mineralization of economic significance are contained in the information on file.

Table 4

Burntbush River Area
(Area C, Figure 2)

Company	Township	Month
Asarco (J.R. Mowat Prop.)	Hurtubise	June
Canadian Javelin	Abbotsford	Sept.
	Adair	Sept.
Cannon Mines	Newman	Oct.
Canadian Superior	Hepburn	Mar., July
	Kenning	May
Jubilant Creek	Kenning	Feb.
Kelly-K Mines	Newman	Sept., Dec.
Nickel Rim	Newman	Nov.
Rio Tinto	Atkinson Lake area	Feb.
	Bradette	Feb., Sept.
	Hurtubise	Feb.
	Noseworthy	Feb.
	St. Laurent	Feb.
Silverplace Mines	Adair	June
	Hepburn	June
Texas Gulf Sulphur	Blakelock	June
	Newman	June
	Tomlinson	June
	Tweed	June
Eagle Head Mines	Newman	Nov.
Tripoint	Newman	Dec.

Parnell-Teetzel Area (Area E, Figure 2)

Can-Fer Mines (Teetzel) and Continental Copper Mines (Cargill) were reported to have completed geological and geophysical surveys during 1967 but no information has been filed.

Coral Rapids Area (Area F, Figure 2)

Kimberlite Mining Corporation conducted geological and geophysical surveys in the area during 1967 but no information has been filed with the Department to date.

Argor Explorations completed a detailed ground magnetic survey and drilled one hole in Valentine township. Carbonatite was intersected but contained no significant mineralization according to information filed with the Department in December.

James Bay Lowlands Area (Area G, Figure 2)

Exploration activity continued in the area throughout 1967. The Alberta Coal Company was granted an exploratory licence on a 375 square mile area near Onakawana in order to evaluate lignite deposits in that area.

Companies active in the area that have filed new information with the Department are given in Table 5.

Moosonee Gypsum (Roebuck and Maher townships) and Keevil Mining (Kineras Township) were reported active in the area but neither company has filed information with the Department during 1967.

Development work is in progress on the columbium-bearing carbonatite deposit discovered in 1966 in the Southbluff Creek area (Area G, No.13, Figure 2) by Consolidated Morrison.

Table 5

James Bay Lowlands
(Area G, Figure 2)

Company	Township	Month
Argor Expln.	S. of Kiasko River	Aug.
Consolidated Manitoba	N. part Southbluff Creek	Oct.
	Centre pt. Southbluff Cr.	Oct.
Consolidated Morrison	Centre pt. Southbluff Cr.	Nov.
Goldray Expln.	James Bay Concession	Oct.
Gradore	Depencier	July
Kerr-Addison	E. of Southbluff Creek	June
Partridge River Mines	South of Bushy Island	Oct.
	S. Partridge River	Oct.
Silverplace Mines	E. of Depencier	Feb.
Timmins-Abitibi Ventures	Carss	June
	Depencier	June, July, Oct.
Yellowknife Bear	N. part Southbluff Creek	Oct.
	Centre pt. Southbluff Cr.	Oct.

Foleyet-Regan Area (Area H, Figure 2)

No major staking took place in this area during 1967, however the companies indicated in Table 6 filed new information with the Department.

Canadian Johns-Manville continued development work at their Reeves township asbestos property (See "Development Work").

Table 6

Foleyet - Regan Area
(Area H, Figure 2)

Company	Township	Month
Ansara, E. E., Prop.	Silk	May
Canadian Johns-Manville	Keith	July
	Reeves	Sept.
Hardiman Bay	Horwood	Feb.
Jonsmith-Falco project	Kenogaming	Jan.
Keevil Mining	Foleyet	Mar.
	Keith	Feb.
Radio Hill Mines	Keith	June
Robertson, D. S., Prop.	Keith	March

East Timmins Area (Area J, Figure 2)

Production from the Ross Mine (Area J, No. 12, Figure 2) continued throughout 1967 (See Table 1). The Munro Copper Mines property came into production during 1967 and plans were announced by Hedman Mines for the development of an open-pit asbestos orebody (See "Development Work"). Johns-Manville have taken an option on the old Wood-Croesus Gold Mines property in Munro township. Some of the richest gold ore ever mined in Ontario came from this property but the structural geology of the area is complex and the ore zone was lost due to faulting (Satterly 1951, pp. 48-51).

New information filed in the Timmins office in 1967 is presented in Table 7.

Table 7

East Timmins Area
(Area J, Figure 2)

Company	Township	Month
Dalhousie Prop.	Michaud	Sept.
Devil's Elbow	Bowman	June
Falconbridge	Garrison	July
Hollinger	Guibord	Aug.
Inco	McCool	July
	Wesley	May
Kennco	Kerrs	July
Midrim	Currie	Sept.
Munro-Croesus	Munro	June
Noranda	Moody	April
Selco	Bond	Feb.
	Bowman	Feb.
	Sheraton	Feb.
Timmins-Abitibi Ventures	Frecheville	March, Sept.
	Holloway	March, Sept.
Union Carbide	McCool	May
Yellowknife Bear	Munro	April, Oct.
Young Davidson	Wilkie	Feb.

Cochrane Area (Area K, Figure 2)

Exploration in the Cochrane Area has been sporadic during 1967. Companies that have filed new information during 1967 are indicated in Table 8.

Base metals, carbonatites, and nickel are, apparently, the main objects of exploration in the area. Of interest is the occurrence of gahnite (zinc-bearing spinel, containing approximately 35 percent Zn) in high grade metamorphic rocks in the Agate-Hurdman township area. The mineral is quite difficult to differentiate in hand specimens and was discovered by Inco geologists as a result of zinc assays that were too high to be explained in terms of the sphalerite content of the rock. Gahnite would probably be overlooked in a non-sphalerite bearing rock.

A considerable amount of information has been filed on the Agate-Hurdman township area in 1967.

Table 8

Cochrane Area
(Area K, Figure 2)

Company	Township	Month
Alamar Mines	Agate	Aug., Oct.
Argor Expl.	Hopkins	Jan.
Boeing Mines	Hurdman	Nov.
Crusader Mines	Hurdman	July, Sept.
Denison	Hurdman	Aug.
Gaspesia	Hurdman	Sept.
Inco	Agate	Oct.
	Blount	June
	Bradburn	Feb.
	Clute	May
	Fournier	June
	Hurdman	Oct.
	Leitch	May
	Shackleton	Sept.
Kayjohn Minerals	Hurdman	Sept.
Kaymo Minerals	Hurdman	May
Keevil	Avon	Feb.
	Mewhinney	Feb.
	Pinard	Feb., July
Kerr-Addison	Alexandra	Dec.
Keevil(Harvey Claims)	Beniah	Dec.
Northmount	Hurdman	Oct.
Parres, L.,Prop.	Laidlaw	March
Parres, A., Prop.	Laidlaw	March, July
	Kirkland	March, July
Silverplace	Hurdman	Oct.

Miscellaneous

Information regarding the exploration activities of Algoma Central Railways on Exploratory Licence of Occupation No. 13, 788 was filed during September, 1967. Exploration in the McBrien-Habel township area (Area L, Figure 2) was aimed at the evaluation of silica sand and kaolin deposits of Cretaceous age that are found in the area.

Goldray Mines are planning geophysical work in the Ridge Lake area approximately 15 miles west of Area L, Figure 2.

Table 9 summarizes miscellaneous assessment information filed during 1967. Watson and Aiken townships are immediately west of Area A, Figure 2.

Table 9

Miscellaneous Information

Company	Township	Month
Algoma Central R. R.	McBrien-Habel (See Area L, Fig. 2)	Sept.
Keevil Group	Watson	May
Marvel Minerals	Aiken	Feb.

New Geological Information

Following reconnaissance mapping by the Ontario Department of Mines in the area north of Kapuskasing, the presence of kimberlite, the host rock for diamond mineralization, was disclosed (Bennett el al 1967, Brown et al 1967). This geological survey, "Operation Kapuskasing" produced a considerable amount of new information on the area.

Another type of mineralization hitherto unknown was the discovery of gahnite (zinc spinel) in high grade sillimanite bearing metamorphic rocks in the Hurdman-Agate township area (Area K, Figure 2; also see "Exploration" section of this report, "The Cochrane Area").

Of importance in the geological interpretation of the immediate Timmins area are a number of major north-trending faults which have strike-slip displacements of up to 5 miles (George et al 1967, George and Leahy 1967). Exploration based on the possible extension of ore-bearing stratigraphic zones will have to allow for such major offsets.

The Dominion Observatory of Canada is in the process of drilling three 1500 to 2000-foot holes at Cochrane, Kapuskasing, and Hearst. The holes are part of a research project on heat flow in various parts of Canada under the supervision of Dr. A. Jessop.

The following is a list of new publications pertaining to the Timmins area:

Texts

Bennett, G., Brown, D.D., George, P.T. and Leahy, E.J.
1967: Operation Kapuskasing; Ontario Dept. of Mines, Misc. Paper 10.

Brown, D.D., Bennett, G., and George, P.T.
1967: The Source of Alluvial Kimberlite Indicator Minerals in the James Bay Lowland; Ontario Dept. of Mines, Misc. Paper 7.

Carlson, H.D.,
1967: Geology of Ogden, Deloro, and Shaw Townships; Ontario Dept. of Mines, Open File Report No. 5012.

Fortescue, J.A.C., and Hornbrook, E.H.W.,
1967: A Brief Survey of Progress made in Biogeochemical Prospecting Research at the Geological Survey; Geol. Surv. Canada, Paper 66-54, pp. 111-133.

George, P.T., et al
1967: The Timmins Area; in C.I.M.M. Centennial Field Excursion Guidebook, Northwestern Quebec and Northern Ontario, pp. 101-134.

Gittins, J., Macintyre, R.M., and York, D.,
1967: The ages of carbonatite complexes in Eastern Canada: Can. J. Earth Sci., V. 4, pp. 651-656.

Milne, V.G.,
1967: Reeves-Kenogaming Area, Kenogaming and Sewell Townships; in Summary of Field Work 1967, Ontario Dept. of Mines, Misc. Paper 11.

Pyke, D.R.,
1967: Langmuir and Blackstock Townships; in Summary of Field Work 1967; Ontario Dept. of Mines, Misc. Paper 11.

Maps

Ontario Department of Mines

Map 2075 Tisdale Township. Scale 1 inch to 1000 feet, S.A. Ferguson.

Map 2116 Chapleau-Foleyet Sheet. Geological compilation series, scale 1 inch to 4 miles. Compilation by H.D. Carlson and J.F. Donovan, 1965.

P. 370 Otter Rapids Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown and P.T. George, 1966.

P. 371 Kesagami Lake Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, and P.T. George, 1967.

P. 372	Cochrane Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, and P.T. George, 1967.
P. 373	Burntbush River Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, and P.T. George, 1967.
P. 375	Onakawana Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, and P.T. George, 1967.
P. 376	Partridge River Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, and P.T. George, 1967.
P. 395	Pivabiska River Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, P.T. George, and E.J. Leahy, 1967.
P. 396	Little Long Rapids Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, P.T. George, and E.J. Leahy, 1967.
P. 397	Hearst Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, P.T. George, and E.J. Leahy, 1967.
P. 398	Kapuskasing Sheet. Preliminary geological map, scale 1 inch to 2 miles. Geology by G. Bennett, D.D. Brown, P.T. George, and E.J. Leahy, 1967.
P. 418	Reeves Township. Preliminary geological map, scale 1 inch to ¼ mile. Geology by V. G. Milne.
P. 419	Penhorwood Township. Preliminary geological map, scale 1 inch to ¼ mile. Geology by V.G. Milne, 1966.
P. 420	Aeromagnetic - Geologic Compilation of the Operation Kapuskasing Area. Scale 1 inch to 16 miles. Compilation by P.T. George, 1967.
P. 425	The Timmins Area. Geological compilation map, scale 1 inch to 1 mile. Compilation by P.T. George and E.J. Leahy, 1967.

O.D.M. - G. S. C. Aeromagnetic Maps

Maps 3911G to 3923G, 3934G to 3946G, and 3957G to 3969G; covering latitude 49°30' to 52°45'N, longitude 83°00' to 84°30'W. Scale 1 inch to 1 mile. Issued 1967.

Geological Survey of Canada

Map 17 - 1967	Geology of the Hudson Bay Lowlands of Manitoba, Ontario, Quebec and District of Keewatin. Preliminary geological map, scale 1: 1,000,000. Geology by H.H. Bostock, L.M. Cumming, B.S. Norford, A.W. Norris, L.L. Price, and B.V. Sanford, 1967.

Acknowledgments

The author would like to acknowledge the co-operation throughout 1967 of all of the prospectors, mine and exploration geologists, mine managers, and mine production staffs in the Timmins area.

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1967: The Timmins area; in C.I.M.M. Centennial Field Excursion Guidebook, Northwestern Quebec and Northern Ontario, pp. 101-134.

George, P.T., and Leahy, E.J.
1967: The Timmins area; Ontario Dept. Mines, Preliminary Map P.425, scale 1 inch to 1 mile.

Mining Journal
1967: Mining Annual Review; 1967 Edition, Mining Journal, London E.C.2.

Northern Miner Press
1967: The Northern Miner; published weekly, 1967, Northern Miner Press, Toronto.

Ontario Department of Mines
1966: 1966 Review of the Ontario Department of Mines; Ontario Dept. Mines, Toronto.

1967: Ontario Department of Mines Gold Bulletins; Ontario Dept. Mines, Toronto.

Satterly, J.
1951: Geology of Munro township; Ontario Dept. Mines, Vol. LX, pt. 8, 1951.

Appendix I

Details Of Assessment Work Filed During 1967 In Timmins Resident Geologist's Area

Timmins Resident Geologist's Files

1967 Date	Company	Township	Timmins File No.	Report	Diamond Drilling
Jan.	Chance Mines	Crawford	T-1319	(R)	
	Jonsmith-Falco Project	Kenogaming	T-622	(R)	
	Mespi	Reid	T-787, Area #8	-	D.D. #R-8, R-10
	Kenilworth Mines	Prosser	T-1253	-	D.D. #1
	E. Pezzolato Prop.	Fripp	T-1320	(R)	
	Inco (Int. Nickel)	Hoyle	T-1321	-	D.D. #29153
	United Macfie Mines	Carman	T-1299	-	D.D. #1, 2, 4
	Argor Mines	Hopkins	T-1322	-	D.D. #H-1
	Hollinger	Mountjoy	T-833	(R)	
	Lake Kozak Mines	Langmuir	T-1323	(R)	
	Mespi	Thorburn	T-787, Area #8	(R's, 2)	
Feb.	INCo	Bradburn	T-747	-	D.D. #29170
	INCo	McCart	T-1324	-	D.D. #29155, -58, -60
	Texas Gulf	Wark	T-461	-	D.D. #W-41-1, -2, 52-3, 42-1.
	Jamieson Copper	Jamieson	T-1261	-	D.D. #J.C.1, -2
	Keevil Min. Gr.	Keith	T-1325	(R)	
	Mespi	Jamieson	T-787, Area #9	(R)	
	Texas Gulf Sulphur	Prosser	T-487	(R)	
	Texas Gulf Sulphur	Wark	T-461	-	D.D. #W52-4, 4A, 4B
	Glencona	Murphy	T-1058	-	D.D. #M-1
	Mespi	Godfrey	T-787, Area #3	(R)	
	Keevil Min. Gr.	Carnegie	T-1309	(R's, 2)	
	Keevil Min. Gr.	Carnegie	T-1326	(R's, 2)	
	Nisto and Jelex	Carnegie	T-1218	(R)	
	Chance Mining	Reid	T-1280	(R)	
	Chance Mining-option	Reid-Mahaffy	T-1327	(R)	
	Mespi	Reid	T-787, Area #8	(R)	
	Conduc	Wark	T-1202	(R)	
	Con-Shawkey	Langmuir	T-1292	(R)	
	Ourgold	Langmuir	T-1328	(R)	
	Hardiman Bay	Horwood	T-721	(R)	
	Ourgold	Jessop	T-1329	(R)	
	Jubilant Creek Mines	Kenning	T-1330	(R's, 2)	
	Mespi	Thorburn-Moberly	T-787, Area ABCD	(R)	
	Silver Ore Zone Mines	Bartlett	T-1331	(R's, 2)	
	Fox Lake Mines & Silverplace Mines	Eldorado	T-1257	(R)	
	Silverplace Mines	E. of DePencier	T-1332	(R)	
	Hollinger	Denton	T-1333	(R)	
	United Buffadison	Fasken	T-1334	(R)	
	Hollinger	Hurdman	T-1335	(R)	
	Young-Davidson	Wilkie	T-1336	(R)	
	Rio Tinto	Atkinson L.	T-1337	(R)	D.D. BG-1, 1A
	Rio Tinto	Bradette, Noseworthy, Hurtubise, St. Laurent	T-1190	-	D.D. B-1, B-2, 6-7
	Marvel Minerals	Aitken	T-1230	(R)	
	Hollinger	Wark	T-1296	-	D.D. #SW-1, SW-2
	Keevil Min. Gr.	Avon, Pinard, Mewhinney	T-1233	(R)	D.D. #P. 66-6
	Kam-Kotia	Jamieson	T-293	-	D.D. #S777, S778
	Keevil Min. Gr.	Kidd	T-1030	-	D.D. #T-66-4, -5
	Cinc. Porc.	Mahaffy	T-1147	(R)	
	Acme Gas & Oil Co.	Douglas, Eldorado, Langmuir	T-1250	(R)	
	S. S. Szetu Prop.	Wark	T-1338	(R)	
	Selco	Bond, Bowman, Sheraton	T-1339	-	D.D. #1, 2, 3, 4, 7, 9, 10
Mar.	L. Parres Prop.	Laidlaw	T-1276	-	D.D. #3-7
	Dillon Prop.	Shaw	T-518	-	D.D. #1
	A. Parres Prop.	Laidlaw-Kirkland	T-1276	Surveys	
	Keevil Min. Gr.	Mahaffy	T-1045	-	D.D. #66-3
	Larchmont Mines	Langmuir	T-1254	(R)	
	Denison Mines (Roman Corp)	Geary	T-1096	(R)	
	David S. Robertson Prop.	Keith	T-1340	(R)	
	Can. Superior Expln.	Hepburn	T-1341	-	D.D. #A-72C-66-1
	Chance Mines Ltd.	Reid	T-1327	(R's 2)	
	Keevil Min.	Foleyet	T-890	-	D.D. #65-1, 65-2A, 64-14
	Hollinger	Dundonald	T-720	-	D.D. #D-40
	H. W. Darling Prop. (old data received from Sylvanite)	Whitney	T-982	(R)	
	Timmins-Abitibi Ventures	Holloway & Frecheville	T-1342	-	D.D. #1 & trenching
	Glencona	Murphy	T-1058	-	D.D. M-2 to M-7
	N. W. Canalask	Langmuir	T-1312	(R)	

1967 Date	Company	Township	Timmins File No.	Report	Diamond Drilling
Mar.	INCo	Thorburn	T-925	-	D.D. #32908
	Chance Mining	Lucas	T-1318	-	D.D. #1
Apr.	Hollinger	Jessop	T-985	-	D.D. #J-2 to J-5
	Jessop Mines Ltd.	Jessop	T-858	-	D.D. #C-1
	Hollinger	Reid	T-1343	-	D.D. #R-1-67, R-2-67
	Mespi	Reid	T-787, Area #8	-	D.D. #R-16B
	Noranda Mines	Moody	T-1141	-	D.D. #1, #2
	Noranda Mines	Carman	T-1344	-	D.D. #1
	Mespi	Reid	T-787, Area #8	-	D.D. #R-17
	Mespi	Thorburn	T-787, Area #8	-	D.D. #R-18
	Yellowknife Bear Mines	Munro	T-1316	-	D.D. #Y66-1 to Y66-7, Y67-Y68.
	Keevil Min. Gr.	Mahaffy	T-1162	-	D.D. #T-66-1, T-66-2
	INCo	Tully	T-1345	-	D.D. #32907
	Keevil Min. Gr.	Crawford	T-1156	-	#T-65-21, T-65-24
May	Jamieson Copper	Jamieson	T-1261	-	D.D. #J.C.7
	Union Carbide	McCool	T-1346	(R)	
	Acme Gas & Oil	McArthur	T-1273	(R)	
	Mining Corp.	Eldorado	T-1241	-	D.D. #1-67
	White Star	Jessop	T-1347	-	D.D. #1, #2
	Lakehead Mines	Douglas, McArthur	T-1304	-	D.D. L-1 to L-5
	Keevil Min. Gr.	Watson	T-1348	-	D.D. #66-7
	Keevil Min. Gr.	Mahaffy	T-1349	-	D.D. #67-1, 67-2
	E.E. Ansara	Silk	T-617	-	D.D. #110-1964
	Mespi	Carman, Langmuir	T-787, Area #2	(R)	
	P. C. E. Expln.	Langmuir	T-1298	(R's 2)	
	Mespi	Thorburn	T-787, Area #8	(R)	
	INCo	Reid	T-1350	-	D.D. #32911, 32912
	Mespi	Reid	T-787, Area #8	(R)	
	Keevil Min. Gr.	Hoyle, Matheson	T-1351	(R)	
	Can. Johns Manville	Munro, Warden	T-291	(R)	
	Cons. Brewis (rec'd from D. McKinnon, Timmins)	Godfrey	T-746	-	D.D. Holes 3-20
	INCo	Wesley	T-875	-	D.D. #32919
	INCo	Clute	T-1353	-	#32354, 32356
	Garstock Group	Tisdale	T-1352	-	D.D. #G-1
	Kaymo Minerals	Hurdman	T-1354	(R)	
	United Buffadison	Fasken	T-1334	-	D.D. #66-1, -4, -5
	Chance Mining	Kidd	T-840	-	D.D. #H.C.i-1967-1
	Chance Mining	Wark	T-1113	-	D.D. #W-1-1967-1
	INCo	Leitch	T-1355	-	D.D. #32353
	Carnkidd	Carnegie	T-841	-	D.D. #2
	Canadian Superior	Kenning	T-1269	(R)	
	Bruce Presto	MacDiarmid	T-848	-	D.D. #5-6-7
	Mespi	Robb	T-787, Area #7	-	D.D. #R-L.4
	Mespi	Robb	T-787, Area #7	-	D.D. #M-23, M-24
June	United Buffadison	Fasken	T-1334	Survey	D.D. 66-2, -3
	Munro Croesus (1936 report rec'd from Dr. Satterly, Toronto, for filing here)	Munro	T-123	(R)	
	Kayjon Minerals Ltd.	Robb	T-1262	(R)	
	J. R. Mowat Prop., optioned by Asarco	Hurtubise	T-1270	(R)	
	Hollinger Cons. Mines	Wark	T-1296	(R)	
	Devil's Elbow	Bowman	T-1314	(R)	
	Texas Gulf Sulphur	Tweed	T-1356	-	D.D. #TW 26-1, 26-2, 26-TW 25-1, TW-16-1
	Texas Gulf Sulphur	Tomlinson	T-1357	-	D.D. #T-22-1, -2, T-33-1
	Texas Gulf Sulphur	Blakelock	T-1358	-	D.D. #B-29-1, -2, B-54-1
	Texas Gulf Sulphur	Newman	T-1359	-	D.D. #N-61-1, -2, 41-1, N-82-1, -2
	INCo	Fournier	T-1234	-	D.D. #32909
	INCo	Blount	T-1360	-	D.D. #32355, 32355A
	INCo	Duff	T-1361	-	D.D. #32914
	Mespi	Bristol	T-787, Area #3	-	D.D. #BC. -3
	Timmins-Abitibi Ventures Inc.	Carrs-DePencier	T-1294	(R's 4)	
	INCo	Lucas	T-726	-	D.D. #29179
	Radio Hill Mines	Keith	T-1362	-	D.D. #G-1, G-2
	INCo	Fournier	T-1234	-	D.D. #29169
	Gaspe Park Mines	Macklem	T-1363	-	D.D. #1, #2
	Min. Corpn. Option (Con-Shawkey)	Langmuir	T-1292	(R's 2)	
	International Kenville	Langmuir, Fallon	T-1205	(R,1965)	

1967 Date	Company	Township	Timmins File No.	Report	Diamond Drilling
June	Kerr-Addison	Southbluff Cr. E. of	T-1290	(R's 3)	
	McWatters option (M. & M. Porc.)	Carman	T-1208	(R)	
	Conduc	Kidd	T-1104	(R's 2)	
	Larche & Rousseau Prop.	Fripp	T-1365	(R)	
	R. Allerston Prop.	Godfrey	T-1366		D.D. #1
	North Rankin	Moberly & Thorburn	T-1048	(R)	
	Silverplace Mines	Langmuir	T-1364		D.D. #66-1, 66-2
	Silverplace Mines	Adair & Hepburn	T-1367	(R)	
July	A. L. Parres Prop. (option to Guggenheim)	Ford, Laidlaw	T-1019	(R's 2)	
	Mespi	Thorburn	T-787, Area #8	(R)	
	Gradore Mines	DePencier	T-1368	(R's 2)	
	Can. Johns-Manville	Keith	T-1369	(R)	
	Kennco	Kerrs	T-853	(R's 3)	
	Can. Superior	Hepburn	T-1341	(R)	
	Keevil Min. Gr.	Pinard	T-1370	(R)	
	Falconbridge Nickel Mines	Garrison	T-1371	(R)	
	INCo	McCool	T-745	-	D.D. #18166-1963
	Jelex	Reid	T-1218	-	D.D. #C-2
	Cincinnati Porcupine	Robb	T-1166	(R's 2)	
	Mespi	Thorburn, Reid	T-787, Area #8	(R)	
	Mespi	Thorburn, SW	T-787, Area #8	(R)	
	Crusader Mines	Hurdman	T-1372	(R)	
	Hollinger opt. (Paymaster Cls.)	Jamieson	T-711	(R)	
	Timmins-Abitibi Ventures, Inc.	DePencier	T-1294	(R)	
Aug.	Argor Expln.	So. of Kiasko R., Centre pt. So. Bluff Creek	T-1286	(R's 2)	
	Cincinnati Porcupine	Robb	T-1166	-	D.D. #C.P. 3, 6, 7, 8, 18, 19, 20, 21, 23
	Jamieson Copper	Jamieson	T-1261	-	D.D. #J.C. 4, 5, 6
	Canadian Lencourt	Robb, Jamieson	T-1373	(R)	
	McWatters	Langmuir	T-652	-	D.D. #67-1, -2, -3
	Mespi	Reid	T-787, Area #8	-	D.D. #R-5
	Mespi	Carscallen	T-787, Area #3	-	D.D. #W.C.7
	L. E. Hill Prop.	Cody	T-807	-	D.D. #3, 4, 5
	Alamar Mines Ltd.	Agate	T-1374	-	D.D. #1, #2
	Mespi	Carman	T-787, Area #2	-	D.D. C.L.-1-2-3
	Keevil Min. Gr.	Mahaffy	T-1349	(R)	
	Conduc (Lamaque)	Wark	T-1202	-	D.D. #T-66-9
	Conduc (Lamaque)	Wark	T-1186	-	D.D. #T65-20, 65-27
	Chance Min.	Eldorado	T-1375	(R)	
	Keevil Min. Gr.	Tully	T-1376	(R)	
	Acme Gas & Oil	Price	T-1377	(R)	
	Hollinger	Guibord	T-740	(R)	
	Denison Mines	Hurdman	T-1378	(R)	
Sept.	Keevil M. Gr.	Kidd	T-1104	(R)	
	Crusader Mines	Hurdman	T-1372	(R)	
	Kayjohn Minerals	Hurdman	T-1379	(R)	
	Gaspesia Min. Co.	Hurdman	T-1380	(R)	
	Keevil M. Gr.	Carnegie	T-1381	(R)	
	Keevil M. Gr.	Tully	T-1382	(R)	
	Timmins-Abitibi Ventures	Frecheville, Holloway	T-1342	(R's 3)	
	Midrim Min. Co.	Currie	T-1383	(R)	
	Carnkidd (Chance)	Carnegie	T-841	(R)	
	INCo	Shackleton	T-1384	-	D.D. #32327
	INCo	Tucker	T-1385	-	D.D. #32324
	Mespi	Jamieson	T-787, Area #9	(R)	
	Kelly-K Mines	Newman	T-1386	(R)	
	Rio Tinto Can. Expln.	Bradette	T-1190	(R)	
	E. Galata Prop.	Langmuir-Eldorado	T-1387	-	D.D. #1 - #4
	Hollinger	Evelyn	T-930	-	D.D. #E-1A, E-2
	Can. Javelin	Adair, Abbotsford	T-1268	(R's 2)	
	W. Turney Prop.	Taylor	T-1388	-	D.D. #1
	Algoma Central Railway	McBrien, Amery, Garden, Habel, Hambly	T-1303	(R's 7)	
	C-J-Manville	Reeves	T-506	-	D.D. #B.R.76A
	Loveland Syndicate opt. Asarco	MacDiarmid	T-906	-	D.D. #M-1 to M-4
	T. Michie Prop.	Adams	T-1315	-	D.D. #7
	T. R. Clarke	Adams	T-1389	-	D.D. #S-1
	Mespi	Tully	T-787, Area #4	(R)	
	Ourgold Min. Co. Ltd.	Jessop	T-1329	-	D.D. #J-1, J-2

1967 Date	Company	Township	Timmins File No.	Report	Diamond Drilling
Sept.	New Harricana M. opt.	Cote	T-1181	-	D.D. #561-1
	Dalhousie Prop.	Michaud	T-1390	-	D.D. #DM 66-1, -2
	Pyrotex Min. & Expln.	Eldorado	T-1391	(R)	
	Can. Lencourt	Whitney	T-1392	-	D.D. #L-1 to L-5
Oct.	Lakehead Mines	Douglas, McArthur	T-1304	(R)	
	White Star Copper	Jessop	T-1347	(R)	
	Texmont	Prosser	T-1393	(R)	
	Mespi, N.W. Reid	Reid	T-787, Area #8	(R's 2)	
	Gomar	Langmuir	T-954	(R)	
	Yellowknife Bear Mines	Munro	T-1316	(R)	
	Quebec Cobalt & Expln. Ltd.	Mann	T-1394	(R)	
	Texmont Mines	Jessop	T-1395	(R)	
	Silverplace Mines	Hurdman	T-1396	(R)	
	Mespi	Loveland, Thorburn	T-787, Area #8	(R)	
	Jarvi option	Sheraton	T-1010	(R's 2)	D.D. #1, #2
	Goldray (Argor Explns.)	James Bay Lowlands (Wacousta, Heath etc.)	T-1232	-	D.D. #1-1, 7-1, 1A, 2, 3, 4, Argor 17-1
	Mespi	Carscallen	T-1100	-	D.D. #W.C.1, 2, 3, 5
	Hollinger	Evelyn	T-930	-	D.D. #N-1
	Timmins-Abitibi Ventures	DePencier	T-1294	-	D.D. #1
	Gaspe Park Mines	Macklem	T-1363	(R)	
	Pyrotex	Eldorado	T-1391	-	D.D. 1-2-3
	Cannon Mines	Newman	T-1397	(R)	
	Jameland Mines (prospectuses)	Robb, Jamieson	T-1398	prospectus	
	Hollinger Cons.	Denton, Thornloe	T-556	-	D.D. #D.T.-35
	Partridge River Mines	So. of Bushy Island, So. of Partridge R.	T-1399	(R)	
	Cons. Manitoba, Yellowknife Bear	James Bay Area, No. & Centre pts. of So. Bluff Creek	T-1400	(R's 2)	
	INCo	Agate	T-1295	-	D.D. #32332
	Alamar	Agate	T-1374	(R)	
	Mespi	Loveland	T-787, Area #7	(R)	
	Hollinger	Loveland	T-794	(R)	
	Northmount Mining Corpn.	Hurdman	T-1402	(R)	
	Hollinger	Loveland	T-1401	-	D.D. #LV-1, LV-2
	INCo	Hurdman	T-1006	-	D.D. #32335
Nov.	Can. Johns-Manville	Garrison	T-370	-	D.D. #G-67-1, 67-1A
	Nickel Rim Mines	Newman	T-1403	-	D.D. #N-1 to N-6
	Victoria Algom	Murphy	T-1404	-	D.D. A-10, -11-12
	Crackingstone Mines Ltd.	Murphy	T-1405	Mag. S.	
	Cons. Morrison	Centre pt. So. Bluff Cr.	T-1286	-	D.D. - Beta #4
	Hollinger opt. (Allerston property)	Reid	T-1306	-	D.D. R.A.-1-67
	Hollinger	Carscallen	T-698	-	D.D. Mc-1-67
	Boeing Mines	Hurdman	T-1406	(R's 2)	
	Cinc. Porc.	Robb	T-1166	(R)	
	Boeing Mines	Hurdman	T-1406	-	D.D. #1-4
	Texas Gulf Sulphur	Kidd	T-823	-	D.D. K-35-3, (Lot 3, C.3)
	Eagle Head Mines Ltd.	Newman	T-1407	(R)	
Dec.	Kerr-Addison Mines	Alexandra	T-1408	(R)	
	Hollinger	Loveland	T-794	-	D.D. #E.C.-1 to E.C.-6
	Hollinger	Loveland	T-1401	(R)	
	Texas Gulf Sulphur	Hoyle	T-1067	-	D.D. #H-8
	Tripoint Mines	Newman	T-1409	(R)	
	Tripoint Mines	Newman	T-1409	(R)	D.D. #67-1
	Kelly-K Mines	Newman	T-1386	(R)	
	Ourgold	Jessop	T-1329	(R)	
	Jamieson Copper R.	Jamieson	T-1261	-	D.D. J.C.3, J.C.8
	Argor Explorations	Valentine	T-1410	Maps	D.D. #V-2-1
	Keevil (Harvey Claims)	Beniah	T-1411	-	D.D. #1, #2.

Volume

4

ONTARIO
DEPARTMENT OF MINES

ANNUAL REPORT
of
RESIDENT GEOLOGISTS' SECTION
GEOLOGICAL BRANCH

1967

PART 4

Southern Ontario by G. R. Guillet

Compliments of
ONTARIO
MINISTRY OF NORTHERN DEVELOPME
AND MINES
Not for resale

MISCELLANEOUS PAPER 19

MARCH, 1968

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PREFACE

This annual report for 1967 is the first separate publication covering the work of the Resident Geologists of the Department of Mines for a specific calendar year. In the past the annual "Summary of Field Work by the Geological Branch" had a section devoted to the activities of the Resident Geologists. This is now discontinued. In the future there will be two separate publications, one dealing with the activities of the summer field parties and published late in the calendar year; the other will cover the Resident Geologists' work and be published early in the following year.

This annual report is issued in four parts to cover the Resident Geologists' districts as follows:

Part 1. Kenora and Port Arthur.
Part 2. Sault Ste. Marie and Sudbury.
Part 3. Kirkland Lake, Cobalt, and Timmins.
Part 4. Southern Ontario.

These reports may be issued at separate times and not necessarily in the order listed above. Notices of the releases will be mailed to those on the Department of Mines Notification List.

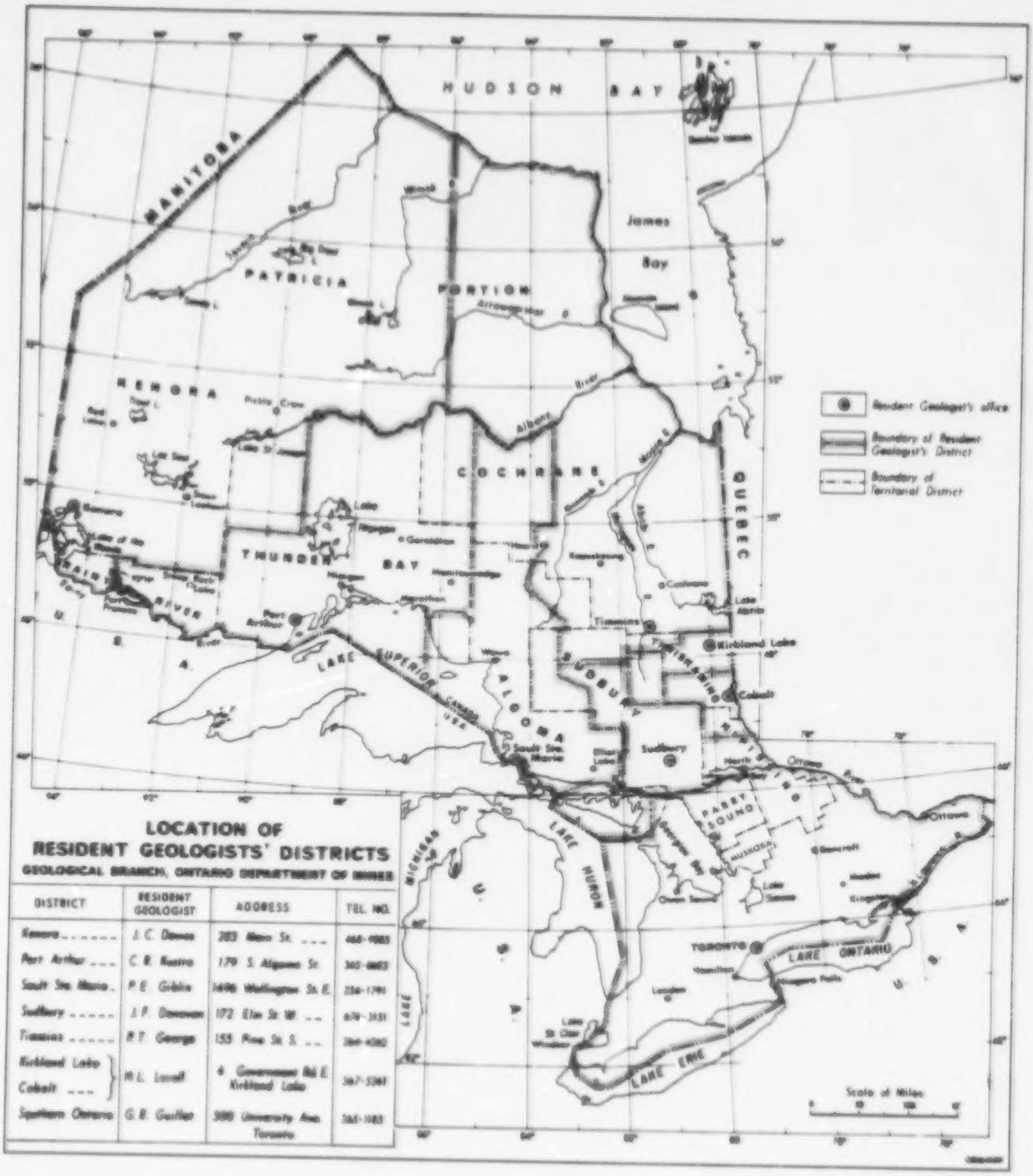
The Resident Geologists are stationed throughout the province to carry on field work and to gather and disseminate information concerning the geology and mineral resources of their districts. At some localities one or more field geologists of the Geological Surveys Section may be permanently

located with the Resident Geologist. In addition to personal observations of the staff, the information collected at the offices includes diamond-drilling records, geological, geophysical, and geochemical maps and reports submitted to the government for assessment work credit, and data on mineral deposits contributed by companies or individuals on a voluntary basis. This information is indexed and kept on open file. Duplicate copies of the assessment work data are also on open file at Room 1323, Mining Lands Branch, Department of Mines, Parliament Buildings, Toronto.

The miscellaneous duties of the Resident Geologists are described in the reports that follow. An index map showing the outline of the resident geologists' districts, and the names, addresses and telephone numbers of the Resident Geologists is shown on the next page.

The objective of this report is to summarize the highlights of the mineral industry in each district during the past year, and also to present any significant new information that may have a bearing on future mineral developments. This could be new discoveries, new geological concepts, new access roads, new maps and literature, the influence of technological advances, new marketing conditions, etc. It is hoped that such data may be useful to those engaged in mineral exploration throughout the province.

J. E. Thomson,
Chief, Resident Geologists' Section.


HUDSON BAY
James Bay
MANITOBA
QUEBEC
PATRICIA
PORTION
KENORA
COCHRANE
THUNDER BAY
ALGOMA
SUDBURY
TIMISKAMING
NIPISSING
PARRY SOUND
MUSKOKA
LAKE SUPERIOR
LAKE HURON
LAKE ONTARIO
LAKE ERIE
MICHIGAN
U. S. A.
Kenora
Port Arthur
Sault Ste. Marie
Sudbury
Timmins
Kirkland Lake
Cobalt
TORONTO
Ottawa
Resident Geologist's office
Boundary of Resident Geologist's District
Boundary of Territorial District
Scale of Miles

LOCATION OF RESIDENT GEOLOGISTS' DISTRICTS

GEOLOGICAL BRANCH, ONTARIO DEPARTMENT OF MINES

DISTRICT	RESIDENT GEOLOGIST	ADDRESS	TEL. NO.
Kenora	J. C. Davies	203 Main St.	468-9885
Port Arthur	C. R. Kustra	179 S. Algoma St.	345-8603
Sault Ste. Marie .	P. E. Giblin	1496 Wellington St. E.	256-1791
Sudbury	J. F. Donovan	172 Elm St. W. ..	674-3151
Timmins	R. T. George	155 Pine St. S. ..	264-4260
Kirkland Lake Cobalt	H. L. Lovell	4 Government Rd E. Kirkland Lake	567-5341
Southern Ontario	G. R. Guillet	590 University Ave. Toronto	365-1183

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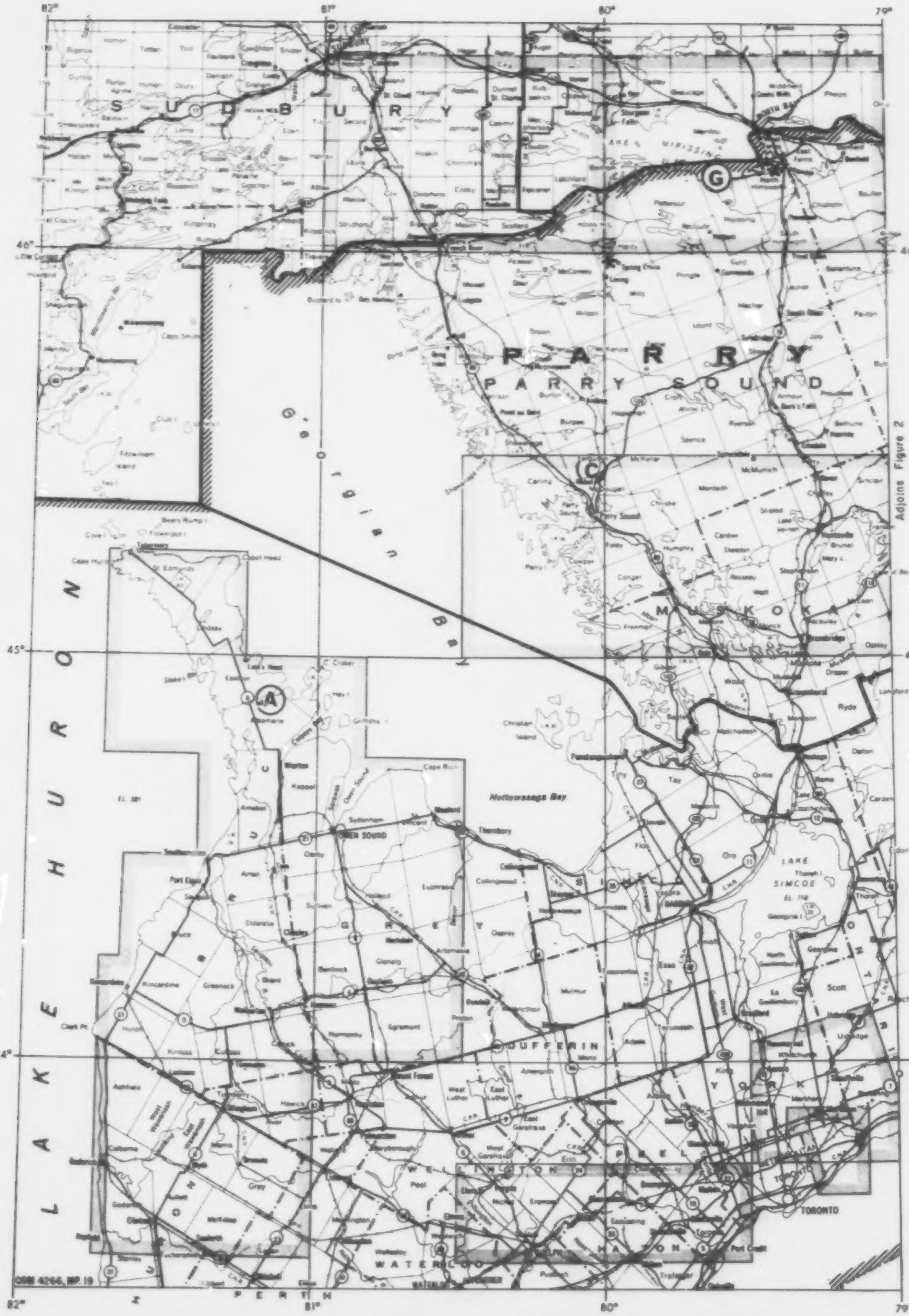
82°
81°
80°
79°
46°
45°
44°
SUDBURY
NIPISSING
PARRY SOUND
Georgian Bay
MUSKOKA
LAKE HURON
BRUCE
GREY
SIMCOE
DUFFERIN
ONTARIO
YORK
PEEL
WELLINGTON
HALTON
WATERLOO
PERTH
HURON
LAKE SIMCOE
Nottawasaga Bay
Christian Island
TORONTO
G
C
A
Adjoins Figure 2

FIGURE 1–SOUTHERN ONTARIO RESIDENT GEOLOGIST'S DISTRICT, WEST PART

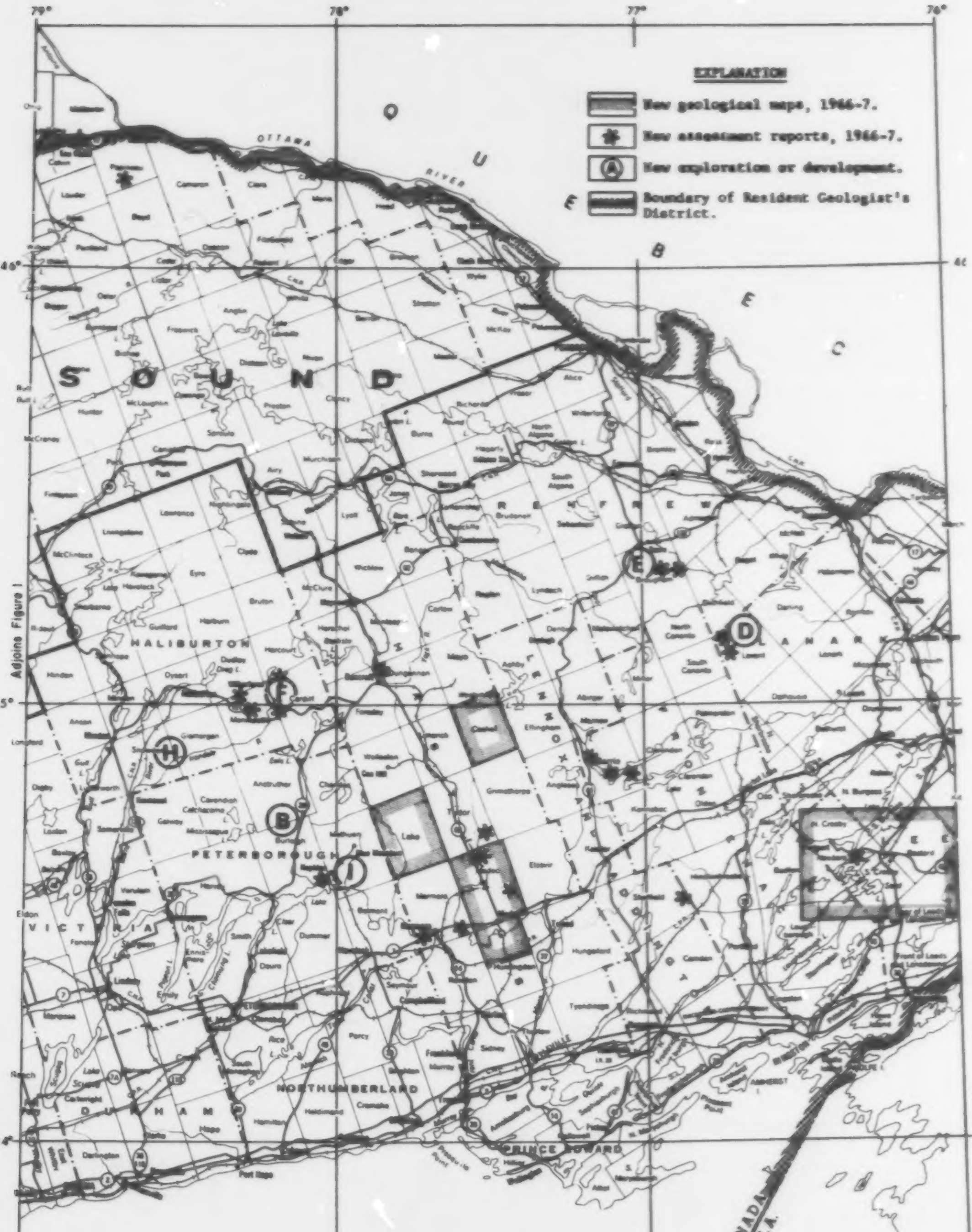
EXPLANATION
New geological maps, 1966-7.
New assessment reports, 1966-7.
New exploration or development.
Boundary of Resident Geologist's District.
79°
78°
77°
76°
46°
45°
44°
Q U E B E C
OTTAWA RIVER
S O U N D
R E N F R E W
HALIBURTON
PETERBOROUGH
L E N N O X
L A N A R K
VICTORIA
D U R H A M
NORTHUMBERLAND
PRINCE EDWARD
L A K E O N T A R I O
CANADA
U.S.A.
Adjoins Figure 1
A
B
D
E
F
H
J
Scale of Miles
0 5 10 15 20 25 30
ODM 4266 MP. 10

FIGURE 2–SOUTHERN ONTARIO RESIDENT GEOLOGIST'S DISTRICT, EAST PART

SOUTHERN ONTARIO DISTRICT

by

G. R. Guillet[1]

INTRODUCTION

The office of Resident Geologist for Southern Ontario was established in November 1966. In the past the functions of this office were performed by various members of the Toronto staff as the need arose. Assessment files were kept in duplicate by the Mining Lands Branch.

Duplicate copies of assessment files for geological, geophysical, geochemical, and diamond drilling reports have now been transferred to the new office. The cataloguing and indexing of these reports has been completed. The office of the Resident Geologist for Southern Ontario is located in Room 901, 500 University Avenue, Toronto.

INCORPORATION OF PARRY SOUND AND EASTERN ONTARIO MINING DIVISIONS

Effective April 1, 1967, the Parry Sound Mining Division was incorporated into the Eastern Ontario Mining Division. The change will simplify administration of the entire Southern Ontario region. Services of the Mining Recorder will continue to function from the Toronto office for the whole area.

---

[1] Resident Geologist, Ontario Department of Mines, Parliament Buildings, Toronto 2. Manuscript received by The Director, Geological Branch, 31 January 1968.

STAKING ACTIVITY, 1967

The number of claims staked during 1967 was nearly 50 percent greater than in 1966, due mainly to renewed interest in uranium. In 1967, 1,976 claims were recorded, and at year end 2,918 were in good standing. Major new claim groups are listed in Table 1, a "group" being a number of claims geographically or numerically contiguous.

TABLE 1. NEW CLAIM GROUPS, 1967

County or District	Township	No. of claims in group
Frontenac	South Canonto	13
	" "	15
	Palmerston	38
Haliburton	Cardiff	18
	"	22
	"	19
	"	10
	"	10
	"	9
	"	27
	Harcourt	29
	Snowdon	30
	"	14
	"	14
	"	11
	"	15
Hastings	Mayo	27
Nipissing	Dickens	35
Parry Sound	Armour	32
	Conger	32
	Ferguson	26
	Proudfoot	78
Peterborough	Anstruther	19
	"	29
	"	33
	Burleigh	22
	Cavendish	24

TABLE 1. (cont.)

County or District	Township	No. of claims in group
Peterborough	Galway	32
	"	52
Renfrew	Blithfield	10
	"	25
	Brougham	16

QUARRY PERMITS, 1967

Quarrying rights for most industrial (non-metallic) minerals on Crown lands may be obtained directly by quarry permit, without recourse to conventional claim staking and assessment work. The advantage, and indeed the intention of such a permit, is the provision for immediate commercial production. A quarry permit is renewable annually for a nominal licensing fee plus a small royalty per cubic yard of material removed.

During 1967, there were 42 quarry permits issued or renewed for southern Ontario (Table 2).

TABLE 2. QUARRY PERMITS, 1967

Commodity	No. of permits issued
Sand and gravel	31
Fill	2
Marble	5
Granite	1
Stone	1
Silica	1
Mica, amazonite, feldspar	1
	42

EXPLORATION AND MINING DEVELOPMENTS

Some of the more interesting exploration activities and mining developments are summarized on the following pages. The code letters will locate the areas on the accompanying maps of Southern Ontario (Note: The code letters are circled on the maps for easy identification).

A Bruce Peninsula Zinc

Perhaps the most interesting exploration activity in Southern Ontario in 1967 was the search for sphalerite in Silurian Dolomite of the Bruce Peninsula. Because there is no Crown land in the area, all properties were acquired by private option. Companies acquiring land included:

M. J. Boylen Prospector Account,
Coniagas Mines Limited,
Kamalta Exploration Limited,
New Harricana Mines Limited,
Northern Canada Mines Limited,
Reef Point Mines Limited.

The first major interest in the zinc mineralization of the area was during the period 1910-1914 when the Albemarle Zinc Company opened a pit near Wiarton and produced a few hundred pounds of hand-cobbed sphalerite. Traces of galena and sphalerite have long been known in these rocks throughout the length of the Niagara Escarpment. The recent interest stems from an extensive soil-sampling study by the Boylen organization that revealed a number of geochemical anomalies.

Zinc mineralization favours the contact region between the Amabel Dolomite and the overlying Guelph Dolomite, especially in the more porous reefal areas. The sphalerite is mostly light-coloured and difficult to recognize. It occurs in small disseminated crystalline patches, as a filling of fractures and pore spaces, replacing fossils, and in spherical concretions. Galena is practically absent.

Drilling has revealed a lack of vertical continuity of mineralization. By mid-summer most activity had ceased, and little new work was anticipated. On the property of Reef Point Mines Limited in Albemarle township a total of 5,000 feet of drilling was done in a series of 200-foot vertical holes drilled at 400-foot centres. Some trenching was also carried out on the property. On the property of Coniagas Mines Limited in Eastnor township, seven packsack drillholes were put down to depths not exceeding 50 feet. On the Eastnor township property of Kamalta Exploration Limited, adjoining the Reef Point property on the north, a soil survey revealed a zinc anomaly with values ranging from 800 to 2,500 p.p.m. Five drillholes in this vicinity failed to locate important amounts of sphalerite.

In addition to the Albemarle-Eastnor township occurrences, a few old pits and trenches in St. Edmund township mark the site of an occurrence on the M.J. Boylen Prospector Account property near the tip of the Peninsula.

B Glenn Explorations Limited

Interesting uranium values have been obtained from a drilling program on the former property of Zenmac Metal Mines Limited in southern Anstruther township southwest of Bancroft. Drilling, which began early last summer, and continued in the fall with two drills, was expected to be carried out from lake ice during the winter.

The uranium is present as uranothorite in a mixed zone of pegmatite and biotite gneiss. The zone strikes northeasterly along the north shore of Looncall Lake. Interesting chemical assays have been obtained over widths of 4 to 20 feet on either side of a garnet-biotite gneiss marker horizon. On September 14, 1967, The Northern Miner mentioned an average chemical assay from seven intersections of 2.24 lbs. U_3O_8 per ton over an average core length of 7.94 feet. Previous work had indicated a probable strike length of 1100 feet.

Glenn has also done a small amount of drilling on the nearby property of the former Farcroft Mines Limited.

C Cononaco Mines Limited

Cononaco Mines Limited has opened a marble deposit near Parry Sound with the intention of producing a high-purity calcium carbonate "whiting" for the filler industry. The deposit is on the north side of highway No. 124, between Lorimer and Limestone lakes, in Hagerman township. A mill on the CNR at Waubamik, 8 miles north of Parry Sound and 12 miles from the pit, is scheduled for completion in May 1968.

The deposit consists of coarsely-crystalline marble interlayered with streaks and beds of amphibolite. Although some of the marble is of high-purity and excellent white colour, much of it contains a variety of accessory minerals - graphite, phlogopite, hornblende, diopside, and chondrodite. The company is installing electromagnetic and electrostatic separators to the mill circuit in an effort to reduce the content of these impurities to an acceptable minimum.

During 1967, overburden was stripped from an area 200 by 500 feet, and short diamond drillholes were put down on a 50-foot grid. Analyses of 5-foot core sections indicate an average composition of approximately 85% $CaCO_3$, 7% $MgCO_3$, and 8% acid insoluble. A 600-ton bulk sample was taken out for trial mill runs and testwork.

D West Branch Explorations and Mining Company

Of interest is the recently reported discovery of mercury in a barite vein near Clyde Forks in Lavant township, Lanark county. The Northern Miner (December 7, 1967) reports that the vein contains values in copper, silver, mercury, and antimony.

The deposit was opened in 1919 as a barite occurrence, but there was little production. At that time Spence[1] referred to the unusual variety and number of sulphides present. In more recent years there has been a considerable amount of diamond drilling, some trenching and adit work.

Tetrahedrite and chalcopyrite are the most common sulphides in the vein, but the Laboratory Branch, Ontario Department of Mines, has recognized minute seams of cinnabar, the mercury sulphide, enclosed in both the ore minerals and gangue.

E Molybdenite - Renfrew Area

During the last few years there has been a small but persistent interest in molybdenite in central Brougham township, about 18 miles west of Renfrew. A number of occurrences are known in an area underlain by marble and paragneiss injected by granite pegmatites. The favourable zone extends for several miles, and contains three past producers.

---

[1] Spence, H.S., 1922: Barium and strontium in Canada; Canada Dept. Mines, Mines Branch, No. 570, 1922, p. 53-54.

The Hunt Mine on the shore of Condon Lake was the largest producer; it was worked by the Renfrew Molybdenite Company (1915-1918). The mine was developed to a depth of 150 feet by four levels and 2,000 feet of drifting. The O'Brien and Ross properties, 2 miles west of the Hunt Mine, recorded a small production from open cuts.

The Spain Mine is 8 miles west of the Hunt Mine, in Griffith township. W.J. Spain reported a small production from a quarry just south of highway No. 41 in 1915-16.

Molybdenite is found near the granite-marble contact, either as veins and seams in gneiss or in granite pegmatite. Occurrences are typically rusty pyrite-pyrrhotite zones containing disseminated coarse flakes of molybdenite.

The sulphide zones lend themselves to electrical methods of geophysical prospecting, and the vicinities of most of the known occurrences have been covered by self-potential surveys. However, diamond drilling of the anomalies has not yet resulted in the discovery of any new molybdenite occurrences of importance.

F Georgia Lake Mines Limited

In a search for molybdenite, Georgia Lake Mines Limited explored several old showings in Monmouth and Cardiff townships during the latter half of 1966. Early in 1967 it was announced (The Northern Miner, January 12, 1967) that the Company was preparing to drive an adit to the molybdenite zone on the Joiner property in Cardiff township, but this had not been started by year end.

During 1966, a 30-claim group in north-central Monmouth township was prospected by magnetometer, soil geochemical, induced potential and resistivity surveys. Drilling of several induced potential and geochemical anomalies did not reveal significant molybdenite. The area is underlain by granite, amphibolite gneisses, and marble.

The Joiner property on the north half of lot 3, concession XX, Cardiff township, has been explored a number of times over the past 50 years. A considerable amount of trenching and drilling has revealed several lenses of limited tonnage but good grade. Molybdenite occurs particularly in pyroxene syenite pegmatite, but also in paragneiss and marble near their contacts with syenite.

Late in 1966 Georgia Lake Mines Limited carried out further drilling on the Joiner property. It was reported in The Northern Miner (January 12, 1967) that an average grade of 0.22 percent MoS_2 was indicated over a width of 8.5 feet and a length of 500 feet. Earlier drilling by Molybdenum Corporation of America had indicated a grade of 0.63 percent MoS_2 over 18.7 feet. It is believed that Georgia Lake carried out further drilling early in 1967, but there has been no activity on the property since March.

G Min-Ore Mines Limited

During the past year Min-Ore Mines Limited has carried out geophysical and diamond drilling exploration on an area of Callander Bay, Lake Nipissing, covered by an exploratory licence held by Carl Palangio of North Bay. Callander Bay is underlain by a circular stock of alkaline syenite.

In 1966 a magnetometer and electromagnetic survey carried out on lake ice revealed two weak magnetic anomalies and three electromagnetic conducting zones. One magnetic anomaly coincides with an EM conducting zone, and a single drillhole in this area intersected granitic, syenitic, and occasional dark porphyroblastic rocks. Sampled sections of the core assayed 0.01-0.05 percent Cb_2O_5. A second hole did not encounter significant mineralization.

Seven drillholes put down through the ice in March 1967 also encountered sections containing low columbium values.

H Miro Mines Limited

At year end, a new uranium discovery was announced. The occurrence is southeast of Minden in central Snowden township, Haliburton county.

The showing is located in the south half of lot 19, concession VIII, and consists of a northeast-trending shear in granite gneiss. According to consulting geologist R.M. Williams[1] a 24-inch chip sample returned 0.820 percent U_3O_8 by chemical assay, and a grab sample of the country rock assayed 0.015 percent. The mineralization has been identified as uranothorite.

Miro Mines Limited has optioned the 48-claim group, and plans an early start on diamond drilling and an airborne scintillometer survey.

I Industrial Minerals of Canada Limited

An expansion program at the nepheline syenite operation of Industrial Minerals of Canada Limited was completed in 1967. Additions to the milling equipment at the Nephton quarry and plant site has resulted in increased productive capacity from 600 to 800 tons per day, mostly in glass-grade products.

Nepheline syenite has been mined continuously at Nephton since 1935. In 1956 a second company, International Minerals and Chemical Corporation (Canada) Limited, commenced production at the eastern end of the same deposit.

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[1] Williams, R.M., 1967: Unpublished report for Miro Mines Limited, October 26, 1967, p. 6.

The nepheline syenite product is about 50 percent albite feldspar and 25 percent each of nepheline and microcline. It finds wide application in the glass, ceramic, and filler industries. Much of the produ[illegible]s exported to the United States, but a growing European market is largely responsible for the recent plant expansion.

ASSESSMENT REPORTS

1967 was the first full year of operation of the Resident Geologist's office in Toronto. Filing and cross-indexing the accumulated assessment reports for Southern Ontario is now complete. A total of 288 geological, geophysical, and diamond drilling reports, representing work done in 72 townships, are now available for public inspection.

Assessment reports for work performed during 1966-7 are outlined in Table 3. The file number refers to the files in the Resident Geologist's office, Room 901, 500 University Avenue, Toronto.

TABLE 3. ASSESSMENT REPORTS 1966-1967

File No.	Location and Remarks
7 Barrie	N½ lot 20, con. VI, Barrie tp., Frontenac co. One drillhole 200 feet long in white marble.
8 Barrie	N½ lot 28, con. IX, Barrie tp. Frontenac co. S½ lot 27, con. X, " " Three drillholes totaling 307 feet in white marble.
10 Barrie	N½ lot 13, con. VI, Barrie tp., Frontenac co. Two drillholes totaling 79 feet show minor lead-zinc mineralization associated with quartz stringers in marble.
32 Cardiff	Lot 9, con. XXI-XXII, Cardiff tp., Haliburton co. Four drillholes totaling 431 feet reported to show graphite.
34 Cardiff	Part lots A and 1-4, con. XIV-XVI, Cardiff tp., Haliburton co. Part lots 33-35, con. X-XII, Monmouth tp., Haliburton co. Airborne magnetometer and electromagnetic survey on a uranium prospect.
4 Monmouth	Part lots 11-17, con. XI-XV, Monmouth tp., Haliburton co. Geochemical, magnetometer, induced potential, and resistivity surveys on a molybdenum occurrence.
14 Monmouth	S½ lot 11, con. XV, Monmouth tp., Haliburton co. Four drillholes totaling 428 feet; a little molybdenite reported in one hole.
4 Dungannon	Lot 67, west boundary, Dungannon tp., Hastings co. One drillhole (120 feet) in hornblende syenite gneiss.

File No.	Location and Remarks
7 Madoc	Part lot 31, con. VI-VII, Madoc tp., Hastings co. Magnetometer and heavy metals soil surveys on property south of the old Hollandia calcite-barite-galena vein.
8 Madoc	Part lots 12-13, con. X-XI, Madoc tp., Hastings co. Geological, magnetometer, and electromagnetic surveys in the vicinity of known quartz-copper veins.
4 Marmora	NW¼ lot 6, con. IX, Marmora tp., Hastings co. Three drillholes totaling 361 feet at the old Ackerman gold mine. One hole shows minor sulphide intersections.
5 Marmora	NW¼ lot 7, con. III, Marmora tp., Hastings co. One drillhole (101 feet) bottomed in gabbro after passing through Paleozoic limestone.
5 Tudor	N½ lots 2-3, con. III, Tudor tp., Hastings co. Three drillholes totaling 340 feet show disseminated copper-nickel mineralization in altered ultrabasic rocks.
6 Lavant	Part lots 20-21, con. VIII, Lavant tp., Lanark co. Eight drillholes totaling 1103 feet show widely disseminated copper-silver sulphides in marble.
7 Lavant	NE¼ lot 20, con. VIII, Lavant tp., Lanark co. Thirteen drillholes totaling 1955 feet show disseminated copper-silver sulphides in marble. Plan shows adit development and surface cuts.
2 South Crosby	NW¼ lot 25, con. VI, South Crosby tp., Leeds co. One drillhole (314 feet) in Newboro Lake at New Mylamaque's iron property intersected granite and gabbro.

File No.	Location and Remarks
1 Sheffield	W½ lot 10, con. XV, Sheffield tp., Lennox and Addington co. Geological report shows zone of sphalerite mineralization up to 6 feet wide and 400 feet long along a marble-granite contact.
3 Papineau	N½ lots 18-19, con. V, Papineau tp., Nipissing dist. Nine drillholes totaling 2864 feet showing disseminated magnetite in anorthosite.
3 Hardy	Part lots 23-25, con. VII-VIII, Hardy to., Parry Sound dist. Magnetometer and electromagnetic surveys on the norite and its contact with metasedimentary rocks near a nickel occurrence on Memesagamesing Lake, shows two weak electromagnetic anomalies in the contact zone.
3 Himsworth	Callander Bay, Lake Nipissing, North Himsworth tp., Parry Sound dist. Electromagnetic survey, and two drillholes totaling 754 feet. Drilling of two narrow anomalies encountered granitic, syenitic, and occasional dark porphyroblastic rocks. Low columbium assays are reported.
4 Himsworth	Callander Bay, Lake Nipissing, North Himsworth tp., Parry Sound dist. Magnetometer survey, and seven drillholes totaling 1090 feet from lake ice. Drilling on three weak anomalies along the east side of the intrusive encountered altered nepheline syenite with traces of columbium mineralization.
10 Burleigh	E½ lot 10, con. XI, Burleigh tp., Peterborough co. Six drillholes totaling 261 feet in white marble.
5 Brougham	Part lots 13-14, con. X-XI, Brougham tp., Renfrew co. Self-potential survey indicates three anomalous zones. Soil sampling over the three zones, and trench sampling in bedrock over one zone, shows no molybdenite.

File No.	Location and Remarks
6 Brougham	Part lots 13-14, con. X-XI, Brougham tp., Renfrew co. Four drillholes totaling 401 feet on three self-potential anomalies found only graphitic marble and small sections of barren pyrite; no molybdenite.
3 Glamorgan	Lots 1-5, con. VII, Glamorgan tp., Haliburton co. Magnetometer and self-potential surveys indicate four small magnetic anomalies on a copper-molybdenite prospect.

INDUSTRIAL DEVELOPMENTS

Major industrial changes of interest to the mineral industry during 1967 were the establishment of several new glass plants and the announced expansion plans of several cement plants. The glass industry is a major consumer of silica sand, nepheline syenite, limestone, dolomite, and soda ash. The manufacture of Portland cement requires limestone, clay or shale, and gypsum or anhydrite; and, of course, in use cement necessitates large volumes of sand, gravel, and crushed stone for concrete aggregate.

Glass Industry

Pilkington Glass Limited opened a new $30,000,000 float-glass plant in Scarborough in June 1967. First of its kind in Canada the plant has a capacity of 2,500 tons of float glass per week, a type of glass that combines the qualities of sheet and plate glass.

Also at mid-year Corning Glass Works of Canada Limited opened a small plant at Bracebridge for the production of television tubes and other specialty items.

Canadian Pittsburgh Industries Limited plans to open its large new plant at Owen Sound early in 1968. This will be a producer of sheet, or window, glass.

Cement Industry

St. Lawrence Cement Company is adding a second kiln to its Clarkson plant. The expansion program, which should be completed in 1968, will increase capacity of the plant from 4.5 to 10 million barrels annually, making it the largest cement plant in Canada.

Canada Cement Company Limited has also announced plans for expansion at its Woodstock plant.

At Bowmanville, St. Mary's Cement Company Limited is constructing a new plant to have a capacity of about 2,000,000 barrels per year.

MINERAL PRODUCTION, SOUTHERN ONTARIO

The total value of minerals, excluding fuels, produced in Southern Ontario in 1966 was $192,868,883, twenty percent of the total value for the province. As shown in Table 4 the mineral economy of Southern Ontario is very largely due to industrial minerals.

Industrial minerals, for the most part, are not marketed on the basis of a world price, as are the metals. A local, highly-competitive, market usually means that location of the deposit is more important than high quality. A gravel deposit is a "gold mine" in Toronto, but may be of negligible value 100 miles away. To illustrate the importance of proximity to market, the results of a study of mineral production in the Toronto-Hamilton area are given in the pages that follow.

Value of production in all cases is f.o.b. pit, quarry, or producer's plant. Final statistics for 1967 are not available.

TABLE 4. SOUTHERN ONTARIO, MINERAL PRODUCTION 1966

Commodity	Number of Producers	Quantity (tons)	Value (dollars)
Iron, magnesium, calcium	2	-	12,774,584
Sand and gravel	251	54,989,469	39,771,817
Clay and shale products	49	-	25,623,040
Crushed stone	59	21,618,107	25,026,488
Portland cement	6	3,242,591	52,680,630
Lime	9	1,078,350	12,232,867
Gypsum	2	565,185	1,581,010
Building stone*	29	289,785	3,824,984
Salt	6	3,782,191	15,243,719
Nepheline syenite	2	366,696	4,109,744
			192,868,883

*Includes ornamental stone, special aggregates, roofing granules, and talc.

Toronto-Hamilton Area

One of the greatest mining camps in Ontario to-day is the Toronto-Hamilton area. The value of mineral production within a 60-mile circle centred in downtown Toronto was 82 million dollars in 1966, second only to the Sudbury camp (Tables 5, 6). Where Sudbury's wealth is in nickel, copper, and the precious metals, Toronto's is in sand and gravel, crushed stone, shale, and cement (Figures 3, 4).

During the period 1950-1966 the value of production in the Toronto-Hamilton area has increased 4-fold while the population has not quite doubled. This increase is partly due to inflation prices, but if we reduce it to 1950 dollars the real increase in productivity is still 3-fold.

Population within the 60-mile circle was 3.7 million in 1966. If it should double in the next 20 years, as it has done in the last 20, it seems likely that the demand on the mineral industries of the Toronto-Hamilton area in 1986 will be 250 million dollars at to-day's prices.

TABLE 5. TORONTO-HAMILTON AREA, MINERAL PRODUCTION 1966

Commodity	Number of Producers	Quantity (tons)	Value (dollars)
Sand and gravel	86	34,251,694	25,252,199
Clay and shale products	21	-	20,363,086
Crushed stone	23	13,974,567	15,322,128
Portland cement	2	848,800	14,369,500
Lime	3	317,800	4,457,700
Gypsum	2	565,185	1,581,010
Building stone	10	131,375	866,292
		Total	82,211,915

TABLE 6. LEADING MINERAL PRODUCING AREAS IN ONTARIO

	Value of Production, 1966
1. Sudbury	$456,933,734
2. Toronto-Hamilton	82,211,915
3. Manitouwadge-Thunder Bay	57,310,758
4. Timmins-Porcupine	52,304,257
5. Steep Rock-Kenora	49,458,190
6. Blind River-Elliot Lake	47,296,884
7. Kirkland-Larder Lake	26,491,691

RESTRICTIVE ZONING LAWS

Restrictive zoning regulations are a serious threat to the mineral industries in urban and near-urban areas. The trend in municipal legislation is towards confinement of existing pit and quarry operations and prohibition of new mineral developments. According to A.M. Blair[1] (1965, p. 5-6):

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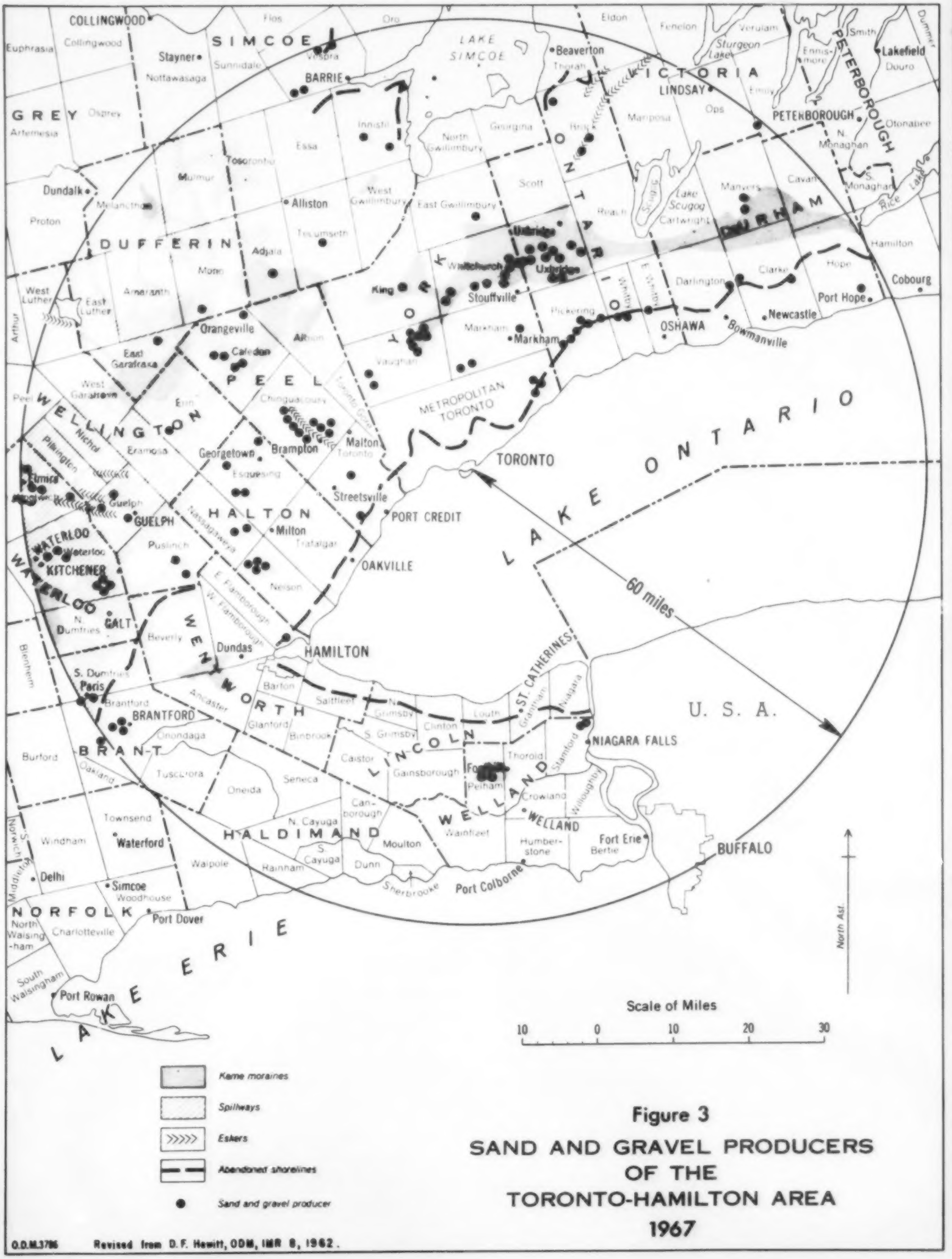
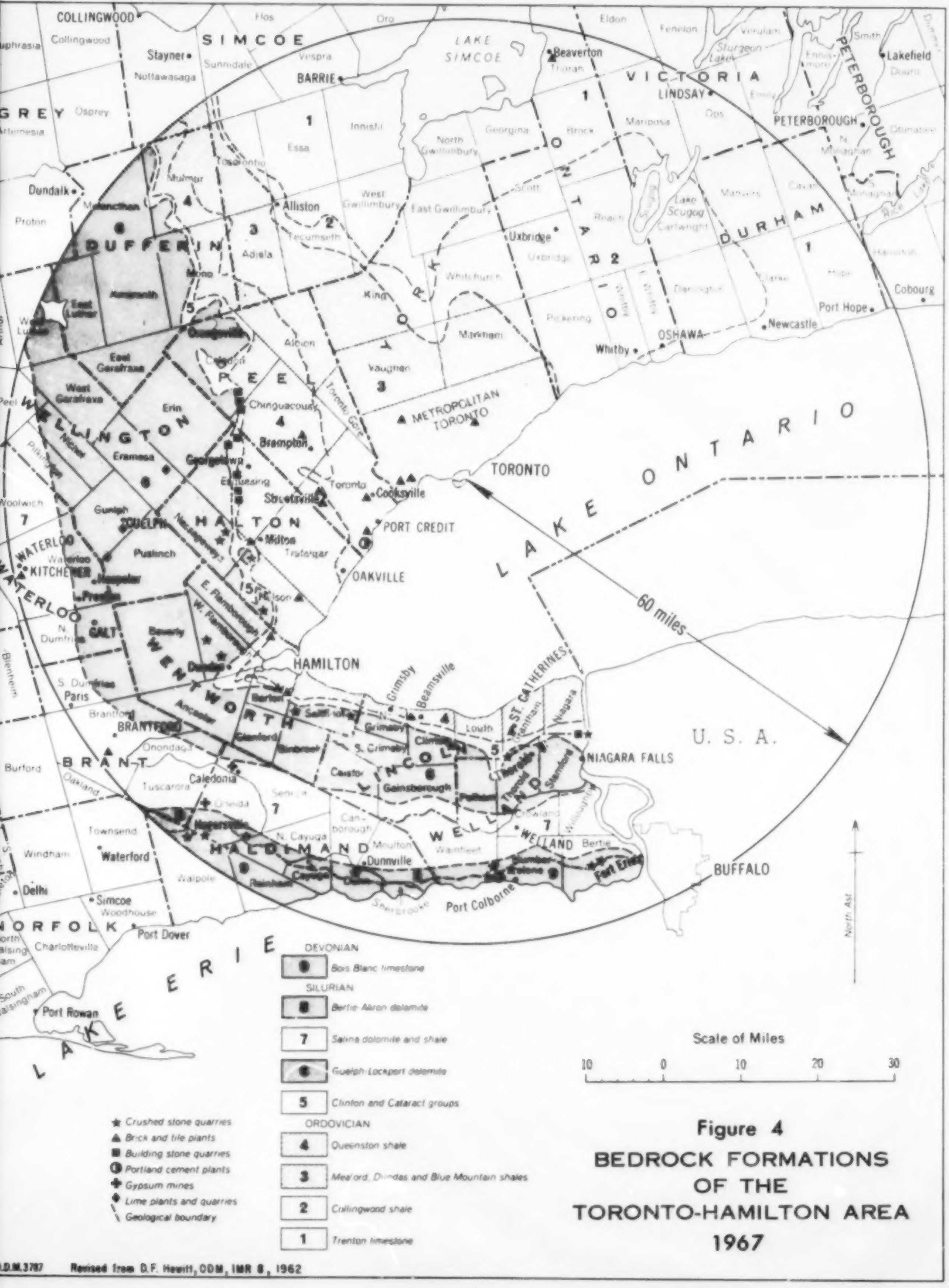
[1] Blair, A.M., 1965: Effects of urban expansion on non-metallic mineral extraction in Southern Ontario; Unpublished paper presented at the 94th annual meeting of The American Institute of Mining, Metallurgical, and Petroleum Engineers, Chicago, February 17, 1965.


COLLINGWOOD
Collingwood
Euphrasia
SIMCOE
Flos
Oro
Vespra
Stayner
Sunnidale
Nottawasaga
BARRIE
LAKE SIMCOE
Beaverton
Thorah
Eldon
Fenelon
Verulam
Sturgeon Lake
Ennismore
Smith
Lakefield
Douro
Dummer
PETERBOROUGH
VICTORIA
LINDSAY
Emily
Mariposa
Ops
Brock
Georgina
North Gwillimbury
Innisfil
Essa
GREY
Osprey
Artemesia
Mulmur
Tosorontio
Dundalk
Melancthon
Proton
Alliston
West Gwillimbury
East Gwillimbury
Scott
Reach
Scugog
Lake Scugog
Cartwright
Manvers
Cavan
Otonabee
N. Monaghan
S. Monaghan
Rice Lake
DURHAM
Hamilton
Cobourg
Hope
Port Hope
Clarke
Newcastle
Darlington
Bowmanville
OSHAWA
E. Whitby
Whitby
ONTARIO
Pickering
Uxbridge
Whitchurch
Stouffville
King
YORK
Markham
Vaughan
DUFFERIN
Adjala
Tecumseth
Mono
Amaranth
West Luther
East Luther
Arthur
Orangeville
East Garafraxa
West Garafraxa
Caledon
Albion
PEEL
Chinguacousy
Toronto Gore
Brampton
Malton
Toronto
METROPOLITAN TORONTO
TORONTO
Peel
WELLINGTON
Nichol
Pilkington
Erin
Eramosa
Georgetown
Esquesing
Elmira
Woolwich
Guelph
GUELPH
HALTON
Nassagaweya
Milton
Trafalgar
Streetsville
PORT CREDIT
OAKVILLE
Nelson
Puslinch
WATERLOO
Waterloo
KITCHENER
N. Dumfries
GALT
Beverly
E. Flamborough
W. Flamborough
Dundas
HAMILTON
WENTWORTH
Barton
Saltfleet
Ancaster
Glanford
Binbrook
S. Dumfries
Paris
Brantford
BRANTFORD
Blenheim
Onondaga
BRANT
Burford
Oakland
Tuscarora
Oneida
Seneca
Caistor
N. Grimsby
S. Grimsby
Clinton
Louth
Grantham
Niagara
ST. CATHERINES
LINCOLN
Gainsborough
Fonthill
Pelham
Thorold
Stamford
NIAGARA FALLS
Crowland
Willoughby
WELLAND
Canborough
N. Cayuga
S. Cayuga
HALDIMAND
Moulton
Wainfleet
Humberstone
Bertie
Fort Erie
BUFFALO
Dunn
Rainham
Sherbrooke
Port Colborne
Townsend
Windham
Waterford
S. Norwich
Middleton
Delhi
Walpole
Simcoe
Woodhouse
NORFOLK
North Walsingham
Charlotteville
Port Dover
South Walsingham
Port Rowan
LAKE ERIE
LAKE ONTARIO
U. S. A.
60 miles
North Ast.
Scale of Miles
10
0
10
20
30
Kame moraines
Spillways
Eskers
Abandoned shorelines
Sand and gravel producer

O.D.M.3786 Revised from D.F. Hewitt, ODM, IMR 8, 1962.

Figure 3

SAND AND GRAVEL PRODUCERS OF THE TORONTO-HAMILTON AREA 1967


DEVONIAN
9 Bois Blanc limestone
SILURIAN
8 Bertie-Akron dolomite
7 Salina dolomite and shale
6 Guelph-Lockport dolomite
5 Clinton and Cataract groups
ORDOVICIAN
4 Queenston shale
3 Meaford, Dundas and Blue Mountain shales
2 Collingwood shale
1 Trenton limestone
★ Crushed stone quarries
▲ Brick and tile plants
■ Building stone quarries
Portland cement plants
✚ Gypsum mines
◆ Lime plants and quarries
Geological boundary
Scale of Miles
10
0
10
20
30
North Ast
60 miles
LAKE ONTARIO
LAKE ERIE
LAKE SIMCOE
U. S. A.
BUFFALO
NIAGARA FALLS
TORONTO
METROPOLITAN TORONTO
HAMILTON
OAKVILLE
PORT CREDIT
Cooksville
Streetsville
Brampton
Georgetown
Milton
GUELPH
KITCHENER
WATERLOO
GALT
Preston
Hespeler
Dundas
BRANTFORD
Paris
Caledonia
Hagersville
Dunnville
Port Colborne
WELLAND
ST. CATHERINES
Grimsby
Beamsville
Port Dover
Port Rowan
Simcoe
Delhi
Waterford
COLLINGWOOD
Stayner
BARRIE
Beaverton
LINDSAY
PETERBOROUGH
Lakefield
Cobourg
Port Hope
Newcastle
OSHAWA
Whitby
Uxbridge
Alliston
Orangeville
Dundalk
SIMCOE
GREY
DUFFERIN
PEEL
YORK
ONTARIO
VICTORIA
PETERBOROUGH
DURHAM
WELLINGTON
HALTON
WATERLOO
WENTWORTH
BRANT
LINCOLN
WELLAND
HALDIMAND
NORFOLK
O.D.M.3787

Revised from D.F. Hewitt, ODM, IMR 8, 1962

Figure 4
BEDROCK FORMATIONS
OF THE
TORONTO-HAMILTON AREA
1967

> "Much of the regulatory and restrictive legislation has been enacted in very recent years; most of it since 1959. It is of note, and indicative of the attitude of the public, that pits and quarries are the only type of land-use which a municipality can specifically prohibit by authority of the Ontario Planning Act."

The Toronto-Hamilton area is particularly threatened by this type of legislation. Indeed, the two major problems that face the industry in meeting the anticipated demand for industrial minerals are depleting reserves and restrictive zoning laws. Nearby mineral deposits are an asset of great value. Their depletion through utilization is natural and expected, but rendering them unavailable by restrictive zoning is most regrettable.

Most industrial mineral products are bulk materials. They are high-volume low-value commodities with limited market ranges that are critically dependent on transportation costs. Location is all-important, and for most structural materials, every mile that separates the producer and the consumer adds 5 cents per ton to their cost.

The average cost of crushed stone at quarries in the Niagara Escarpment was $1.28 per ton in 1966[1]. Truck haulage from quarries in the Milton area to the junction of highway No. 401 and Yonge Street costs $1.65 per ton. Thus, transportation represents 56 percent of the delivered price of the stone. If we force the stone quarries to retreat a further 18 miles we shall have to pay three times the quarry price for our delivered stone, unless we find cheaper transportation.

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[1] D. F. Hewitt, personal communication.

Can we continue to let individual municipalities decide the future of their own mineral areas? Again quoting Blair[1]:

> "Whereas, at present, the power to regulate land-use has been exercised by a proliferation of small municipalities, the future supply of non-metallics is of concern to residents of all of southern Ontario. In addition, bedrock structure and the arrangement of the various Pleistocene deposits do not conform to municipal boundaries. It would seem that the most rational approach to non-metallic mineral bearing lands would be a regional approach, in which the availability of materials in all of southern Ontario would be inventoried and a plan for future exploitation devised with the co-operation of all interested parties."

PARKS AND RECREATION AREAS

Increasing public demand for parks and recreation areas is having its effect throughout the province. Large new areas - some virtually inacessible wilderness areas, others in the populated south - are being considered as possible provincial parks. The Mining Act supports the Provincial Parks Act in prohibiting mining activities in provincial parks.

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[1] Blair, A.M., 1965: Effects of urban expansion on non-metallic mineral extraction in Southern Ontario; Unpublished paper presented at the 94th annual meeting of The American Institute of Mining, Metallurgical, and Petroleum Engineers, Chicago, February 17, 1965, p. 7.

Unfortunately, some of the most scenic areas of Southern Ontario are also the best mineral areas. The Niagara Escarpment, for example, is the major source of crushed stone and building stone for Toronto and Hamilton. The entire Escarpment, from Niagara to the Bruce Peninsula, is being evaluated as a provincial park.

Also announced in 1967 were initial plans towards creating a public recreation area in the South Georgian Bay region.

Although not yet with park status, and hence not restrictive to mining activities, the North Georgian Bay Reserve includes a large area north of Parry Sound and westwards to include most of the islands north of Manitoulin.

EDUCATION

In recent years the Ontario Department of Mines has viewed with increasing importance the need for public education in mining and geological matters. Accordingly, the Southern Ontario office contributed the session on industrial minerals at the annual February Prospectors Classes in Toronto.

During the summer season visits were made to nine of the ten Junior Ranger camps in Southern Ontario. A 2-hour class in rock and mineral identification and the geology of Ontario was held at seven of these camps. Unfortunately the visits to two other camps in the Powassan area coincided with the annual inter-camp field day, and the classes were deferred in favour of the more popular passtime. Junior Ranger programs are sponsored by the Department of Lands and Forests for 17-year old boys. Full complement at each camp is 24 boys for the 2-month season, and the popular program is always fully subscribed.

Similar classes were given to the 70 boys at the Resource Rangers camp near Haliburton. Resource Rangers are sponsored by the Ontario Forestry Association. The program includes regular branch meetings throughout the year and a one-week combined summer camp at Haliburton. The boys are from all parts of Ontario, and range in age from 10 to 17 years.

NEW LITERATURE ON SOUTHERN ONTARIO GEOLOGY

Recent literature includes reports by the Ontario Department of Mines and the Geological Survey of Canada, and several guidebooks, as listed in the following section. University theses, and papers published in the various scientific journals, are further sources of information.

Ontario Department of Mines

Guillet, G.R.

1967: The clay products industry of Ontario; Indust. Mineral Rept. 22.

Guillet, G.R.

1967: Notes on zinc-lead mineralization in Silurian Dolomite of the Niagara Escarpment and Bruce Peninsula, Ontario; Misc. Paper MP. 8.

Hewitt, D.F.

1967: Geology and mineral deposits of the Parry Sound-Huntsville area; Geol. Rept. 52.

1967: Pegmatite mineral resources of Ontario; Indust. Mineral Rept. 21.

1967: Uranium and thorium deposits of Southern Ontario; Mineral Resources Circ. No. 4.

1967: Pyrite deposits of Ontario; Mineral Resources Circ. No. 5.

1967: Phosphate in Ontario; Mineral Resources Circ. No. 6.

1967: Industrial mineral resources of the Brampton area; Open file (unpublished) Rept. No. 5011.

1967: Geology of Madoc and North Huntingdon townships; Open file (unpublished) Rept. No. 5000.

1966: Geological notes for map 2117: Paleozoic geology of Southern Ontario; Geol. Circ. 15.

1966: Rocks and minerals of Ontario; Geol. Circ. 13.

1966: The Markham-Newmarket sheet; scale 1: 50,000; Open file (unpublished) map.

Notes on the industrial mineral resources of the Markham-Newmarket area are given in the Summary of Field Work, 1965. (Prelim. Rept. 1965-3, p. 57-59).

Karrow, P.F.

1967: Pleistocene geology of the Scarborough area; Geol. Rept. 46.

1966: Pleistocene geology of the Guelph area; Open file (unpublished) Rept. No. 5008.

Laakso, R.K.

1967: Lake township, Hastings county; 1 inch = ½ mile; Map 2106.

Lumbers, S.B.

1967: North Bay sheet; 1 inch = 2 miles; Prelim. Map No. P381.

1967: Burwash sheet; 1 inch = 2 miles Prelim. Map No. P415.

Notes on the geology and mineral deposits of the North Bay and Burwash areas are contained in the annual Summary of Field Work reports, as follows:

1964: Prelim. Rept. 1964-6, p. 45-48.
1965: Prelim. Rept. 1965-3, p. 53-57.
1967: Misc. Paper 11, p. 68-71.

1967: Cashel township, Hastings county; 1 inch = ½ mile; Map 2142.

1966: Geology of Cashel township; Open file (unpublished) Rept. No. 5004.

Geological Survey of Canada

Gross, G.A.

1967: Iron deposits in the Appalachian and Grenville regions of Canada; Vol. II of Geology of iron deposits in Canada; Econ. Geol. Rept. No. 22.

Koepke, W.E., and Sanford, B.V.

1966: The Silurian oil and gas fields of southwestern Ontario; Paper 65-30.

Liberty, B.A.

1966: Geology of the Bruce Peninsula, Ontario; Paper 65-41.

Wynne-Edwards, H.R.

1967: Westport map-area, Ontario, with special emphasis on the Precambrian rocks; Memoir 346.

Field Trip Guidebooks

1) Guidebook for field trip to the Grenville of southeastern Ontario; Instit. on Lake Superior Geology; April 1967.

2) Geology of parts of eastern Ontario and western Quebec; Geol. Assoc. Canada and Mineralogical Assoc. Canada; August-September, 1967.

Miscellaneous

Chapman, L.J., and Putnam, D.F.

1966: The physiography of southern Ontario; 2nd edit. Univ. of Toronto Press.

Other Sources of Information

A regional study of the Bancroft-Madoc area of southeastern Ontario is the subject of a doctoral thesis completed at Princeton University in 1967 by S.B. Lumbers. The study area extends from Bancroft to Madoc on the north and south, and from Arden to Nephton on the east and west. A copy of the thesis, entitled "Stratigraphy, plutonism, and metamorphism in the Ottawa River remnant in the Bancroft-Madoc area of the Grenville Province of southeastern Ontario, Canada", is available in the Library of the Ontario Department of Mines.

Recent activities of the Geological Survey of Canada are briefly described in a new series of semi-annual publications entitled "Report of Activities". Three such publications have been issued to date. Projects pertaining to southern Ontario are listed as follows.

Paper 67-1, Part A: May to October, 1966

Radio wave mapping of ground conductivity anomalies; by A. Becker (p. 130).

Structure and metamorphism, central Hastings County, Ontario; by D.M. Carmichael (p. 133).

Surficial deposits, Athens-Charleston Lake area of eastern Ontario; by E.P. Henderson (p. 142).

Marine seismic survey, Lake Ontario; by G.D. Hobson and E. Holzl (p. 143).

Field test of a new in situ susceptibility meter; by P.J. Hood and H. Cross (p. 145).

Tills of the Stratford-Conestogo (40 P/7, 10) area; by P.F. Karrow (p. 147).

Lake Ontario bottom deposits; by C.F.M. Lewis (p. 153).

Engineering geology investigations, Welland Canal area; by E.B. Owen (p. 158).

Experimental aerial photography around the western shoreline of Lake Ontario; by V.R. Slaney (p. 163).

Palynological investigations, 1966; by J. Terasmae (p. 164).

Mineral collecting areas between Kingston, Ontario and Tadoussac, Quebec; by Ann P. Sabina (p. 212).

Geochemistry of lead and zinc deposits in carbonate rocks; by D.F. Sangster (p. 212).

Paper 67-1, Part B: November 1966 to April 1967

Palaeomagnetism of lower Palaeozoic sediments of southern Ontario; by D.T.A. Symons (p. 9).

Chemical character of lead-zinc deposits in carbonate rocks; by D.F. Sangster (p. 27).

Petrological studies; by K.L. Currie (p. 48).

Granitoid rocks in the region of Loughborough Lake, Ontario; by K.L. Currie (p. 50).

Paper 68-1, Part A: May to October, 1967

Welland Canal area, Ontario; by E.B. Owen (p. 59).

Geochemical prospecting method development, Bancroft, Ontario (31 C, D, E, F); by A.Y. Smith, W. Dyck, J.J. Lynch, D. Church, and S. Withers (p. 62).

Radio wave mapping of Gloucester Fault, Ontario; by A. Becker (p. 67).

Airborne input development contract and survey; by L.S. Collett (p. 69).

Evaluation of airborne gamma-ray spectrometry in the Bancroft and Elliot Lake areas of Ontario (Parts of 41 J and 31 C, D, E and F); by A.G. Darnley (p. 70).

Ground gamma-ray spectrometer survey, Bancroft, Ontario (31 C, D, E, and F); by Michael Fleet (p. 71).

Hammer seismic overburden and bedrock investigations, Dundas, Ontario (30 M/5); by George D. Hobson (p. 75).

Hammer seismograph overburden and bedrock investigations, Welland-Port Colborne, Ontario (30 M); by George D. Hobson (p. 76).

Aeromagnetic investigations of Baffin Bay, the North Atlantic Ocean and the Ottawa area; by Peter J. Hood, P. Sawatzky, and Margaret E. Bower (p. 79).

Moose River and Kinmount areas, Ontario; by W.J. Scott (p. 87).

Ground studies based on airborne infra-red imagery; by V.R. Slaney (p. 88).

Multiband aerial photography; by V.R. Slaney (p. 90).

Study of iron deposits in Canada; by G.A. Gross (p. 95).

Uranium in Canada; by H.W. Little (p. 95).

Geology and detection of the rare earth elements cerium and yttrium; by E.R. Rose (p. 100).

Volcanic studies, Grenville Province, Ontario; by W.R.A. Baragar (p. 115).

Sedimentological studies of the glacial varves in Ontario; by Indranil Banerjee (p. 153).

Mallorytown-Brockville area, Ontario (31 B/5, 12, C/9); by E.P. Henderson (p. 166).

Surficial geology, Stratford-Conestogo area (40 P/7, P/10); by P.F. Karrow (p. 169).

Sediment studies in Lake Ontario and Lake Erie; by C.F.M. Lewis (p. 176).

Palynological investigations, Ontario and Nova Scotia; by J. Terasmae (p. 188).

Investigations of mineral occurrences, Buckingham, Mont-Laurier, Hawkesbury, Ontario and Quebec; by Ann P. Sabina (p. 223).

DC resistivity survey in the Ottawa-Cornwall area, Ontario; by P. Andrieux (p. 226).